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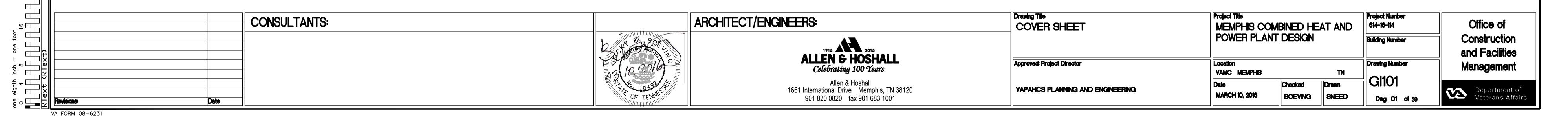
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MEMPHIS COMBINED HEAT AND POWER PLANT DESIGN PROJECT NO. 614-16-114

VA MEDICAL CENTER
1030 JEFFERSON AVE.
MEMPHIS, TENNESSEE



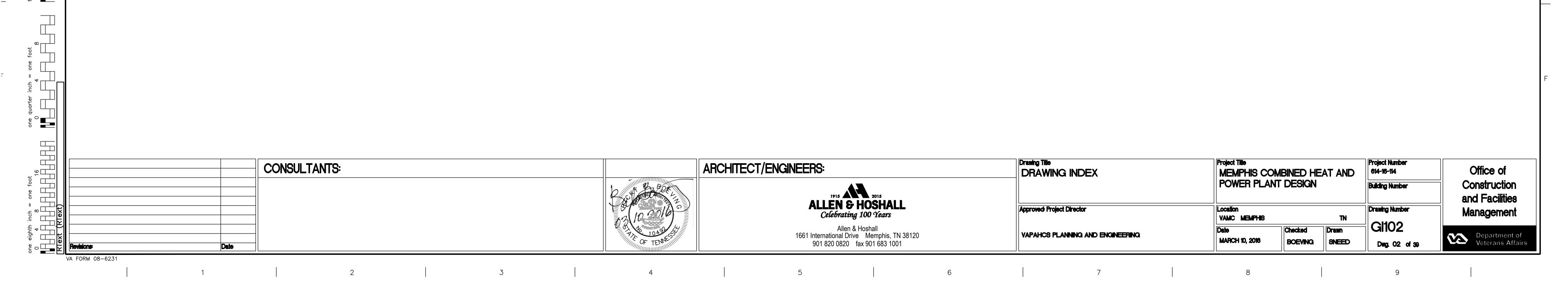
MARCH 10, 2016

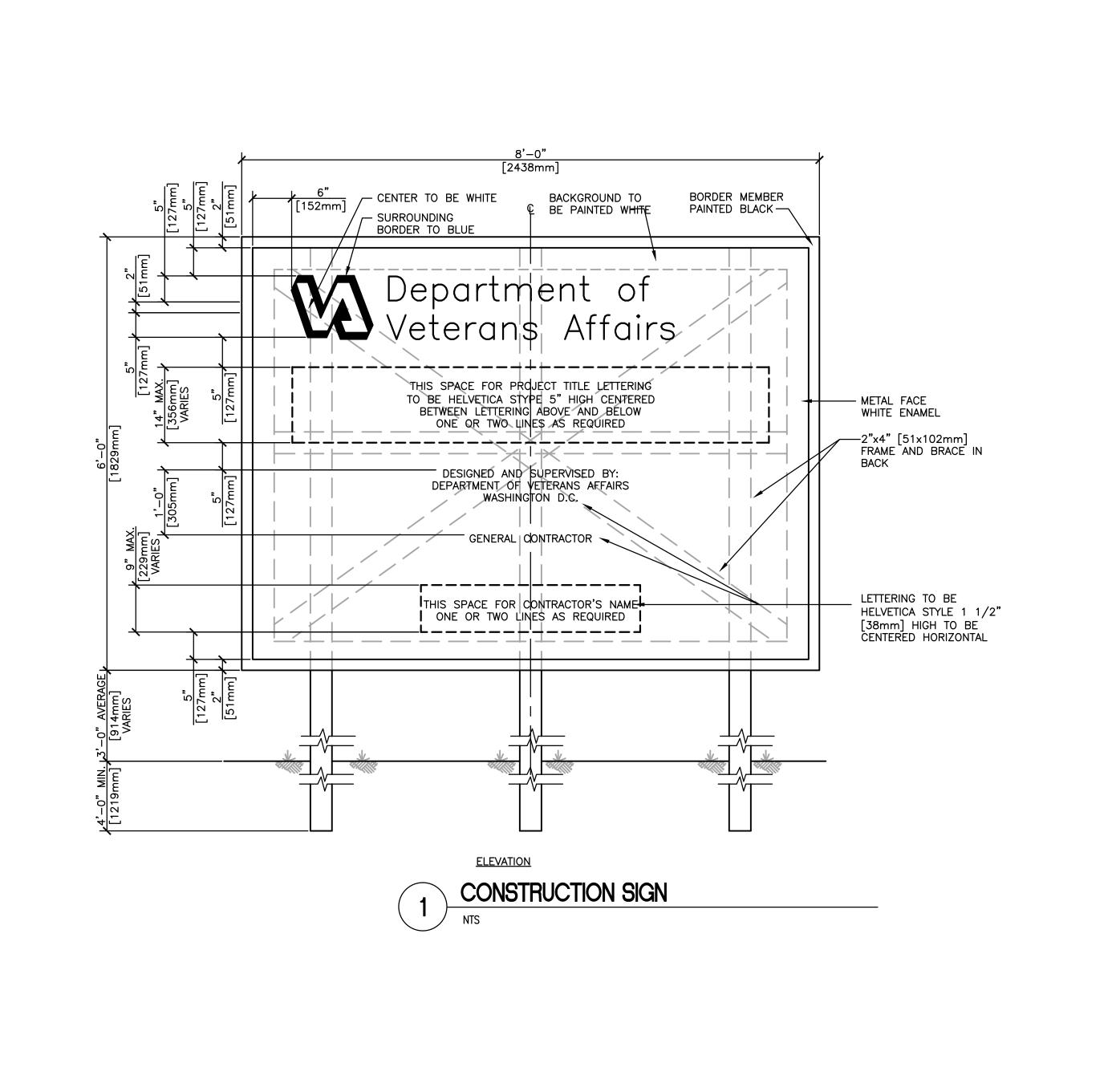


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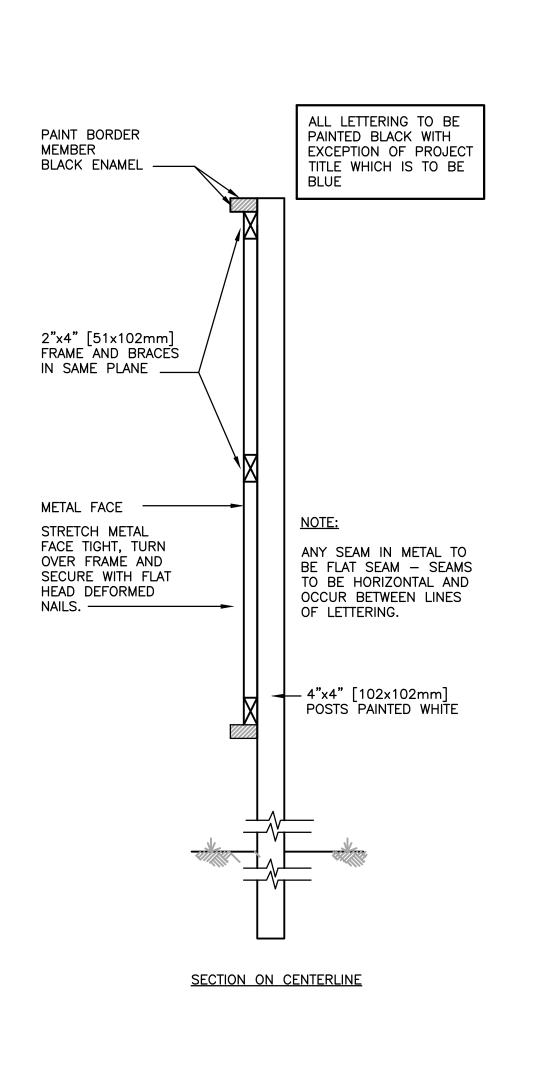


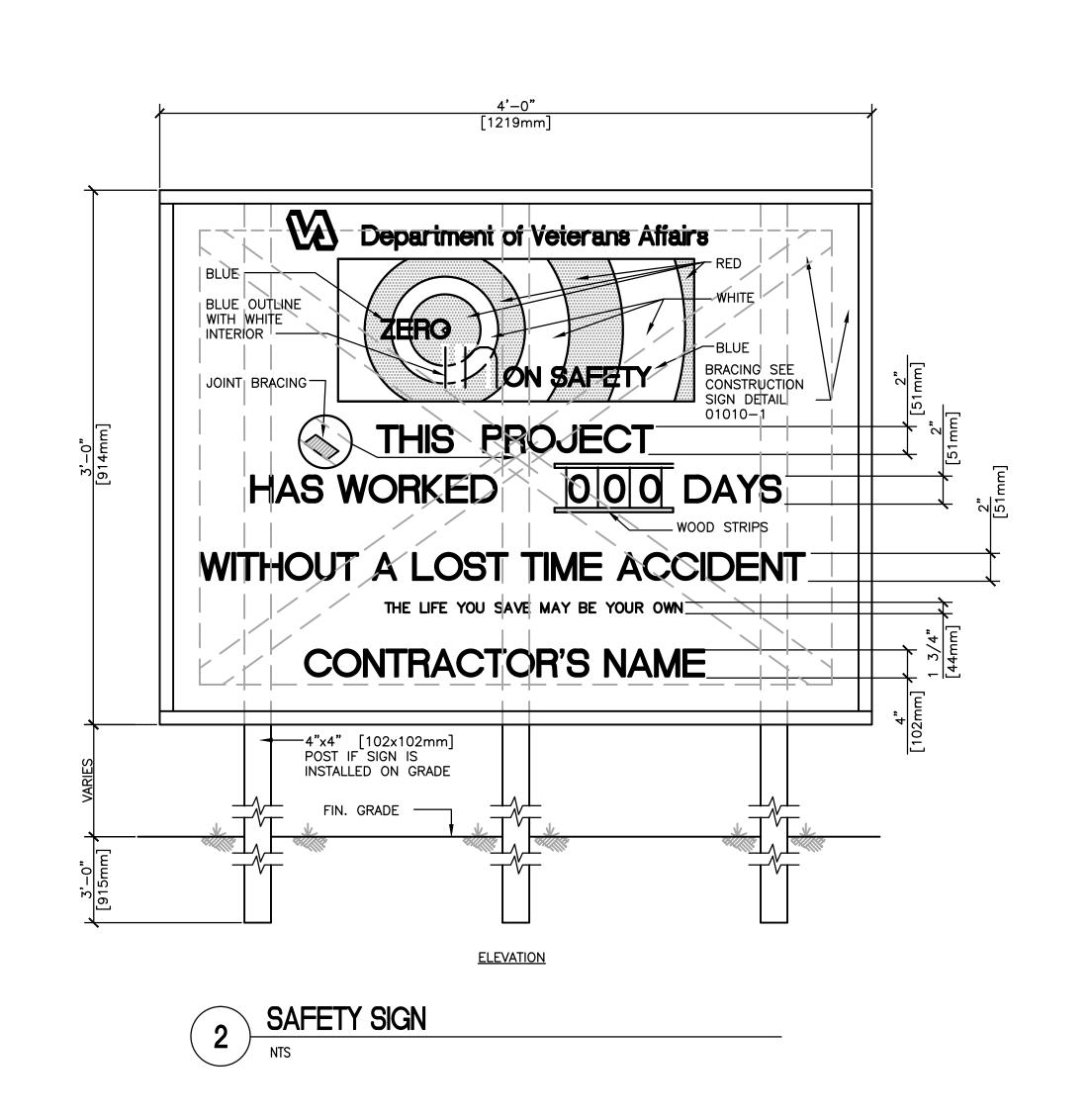


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CONSULTANTS:

VA FORM 08-6231





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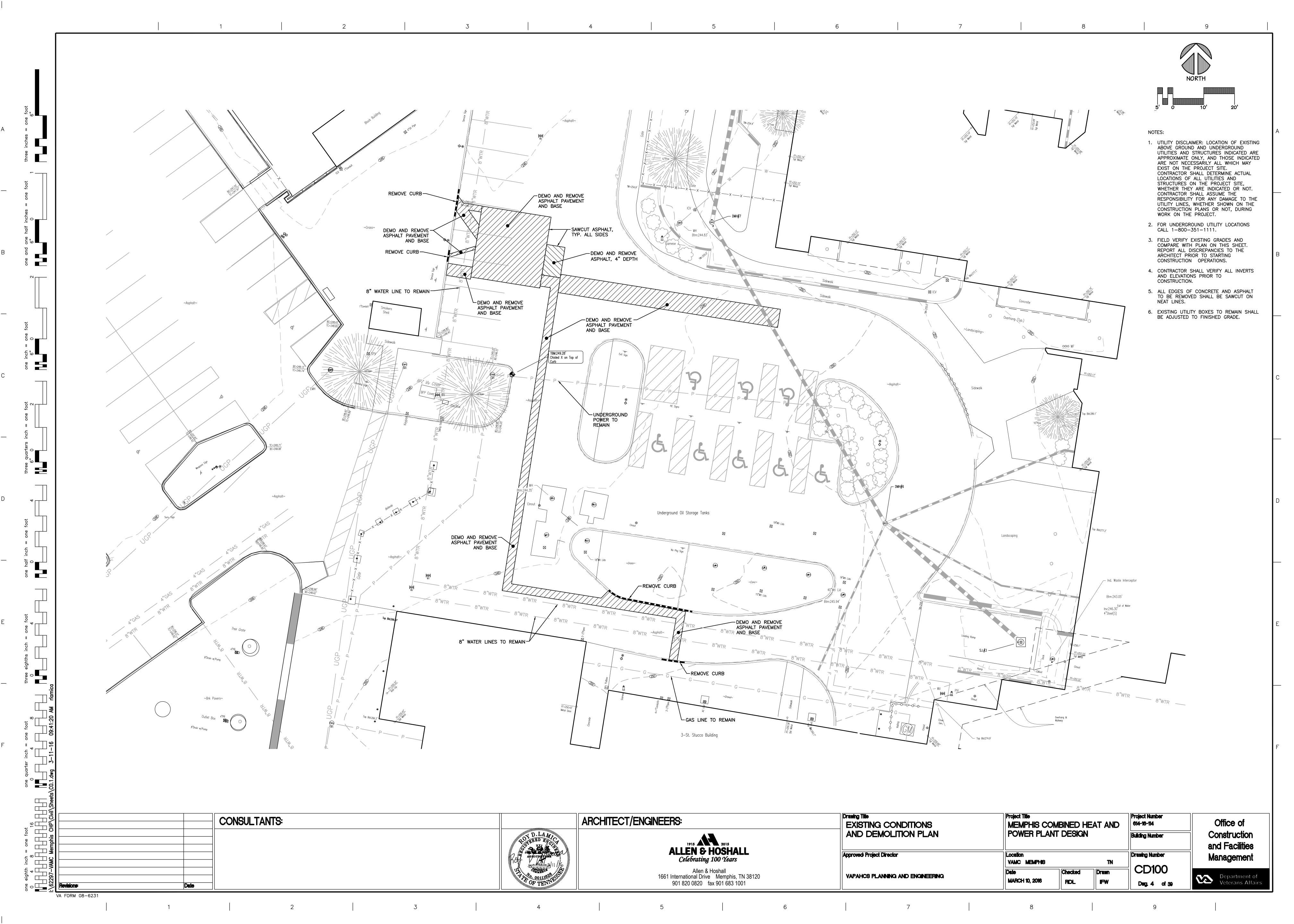
Drawing Title
PROJECT IDENTIFICATION SIGNS **Project Title Project Number** MEMPHIS COMBINED HEAT AND 614-16-114 AND DETAILS POWER PLANT DESIGN **Building Number** GI201 Approved: Project Director Location **Drawing Number** VAMC MEMPHIS GI201 VAPAHCS PLANNING AND ENGINEERING MARCH 10, 2016 BOEVING

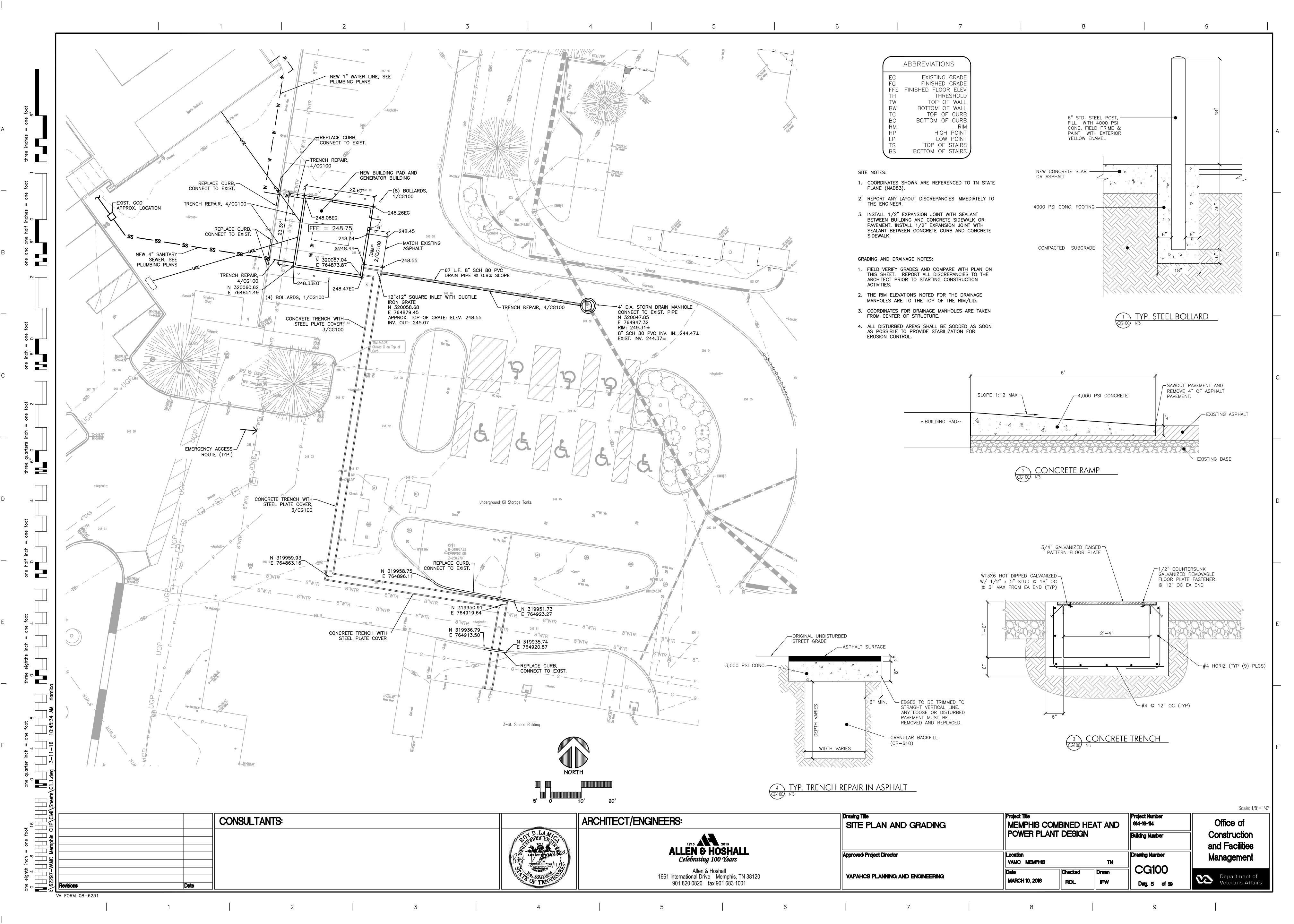
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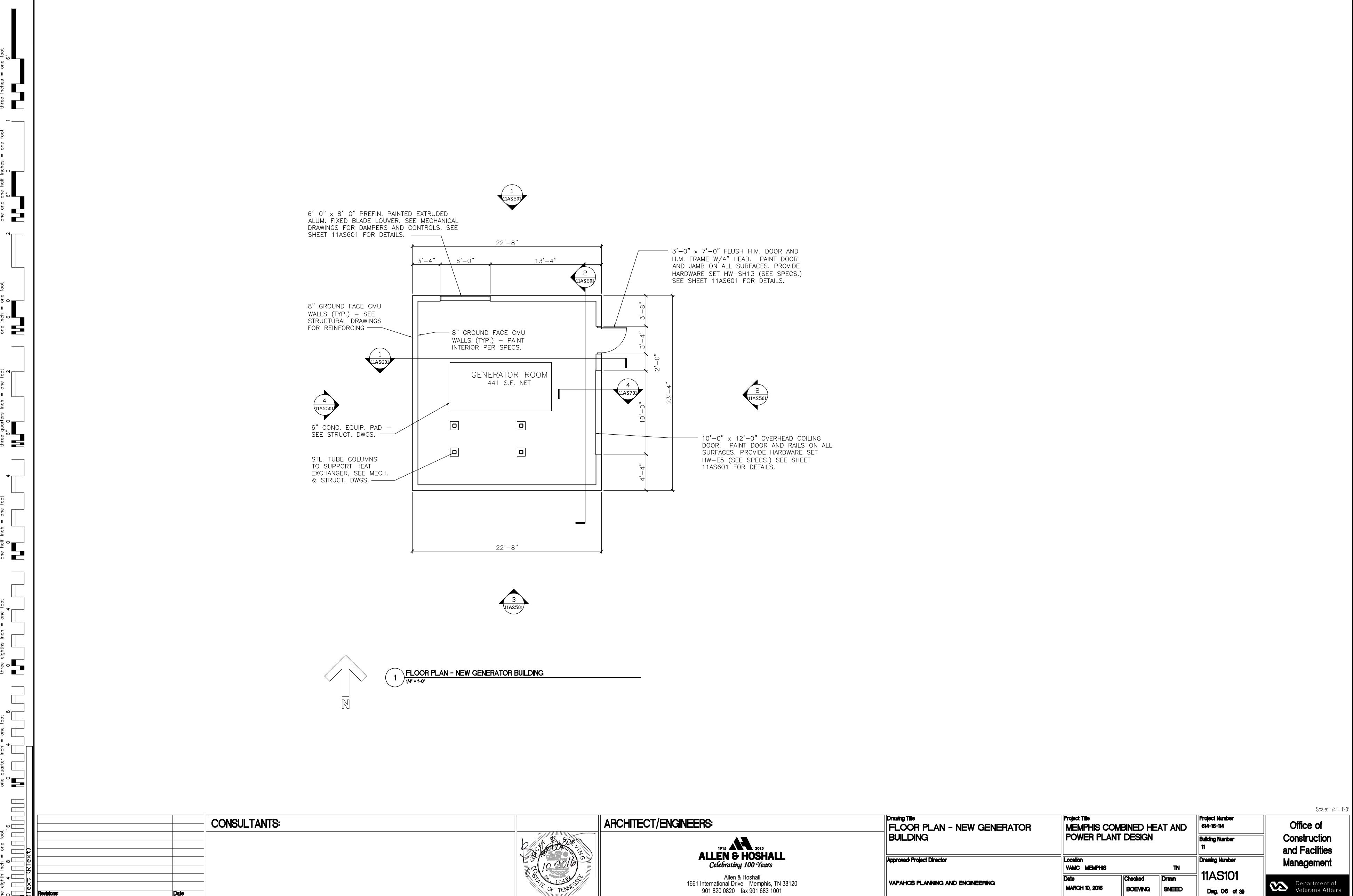
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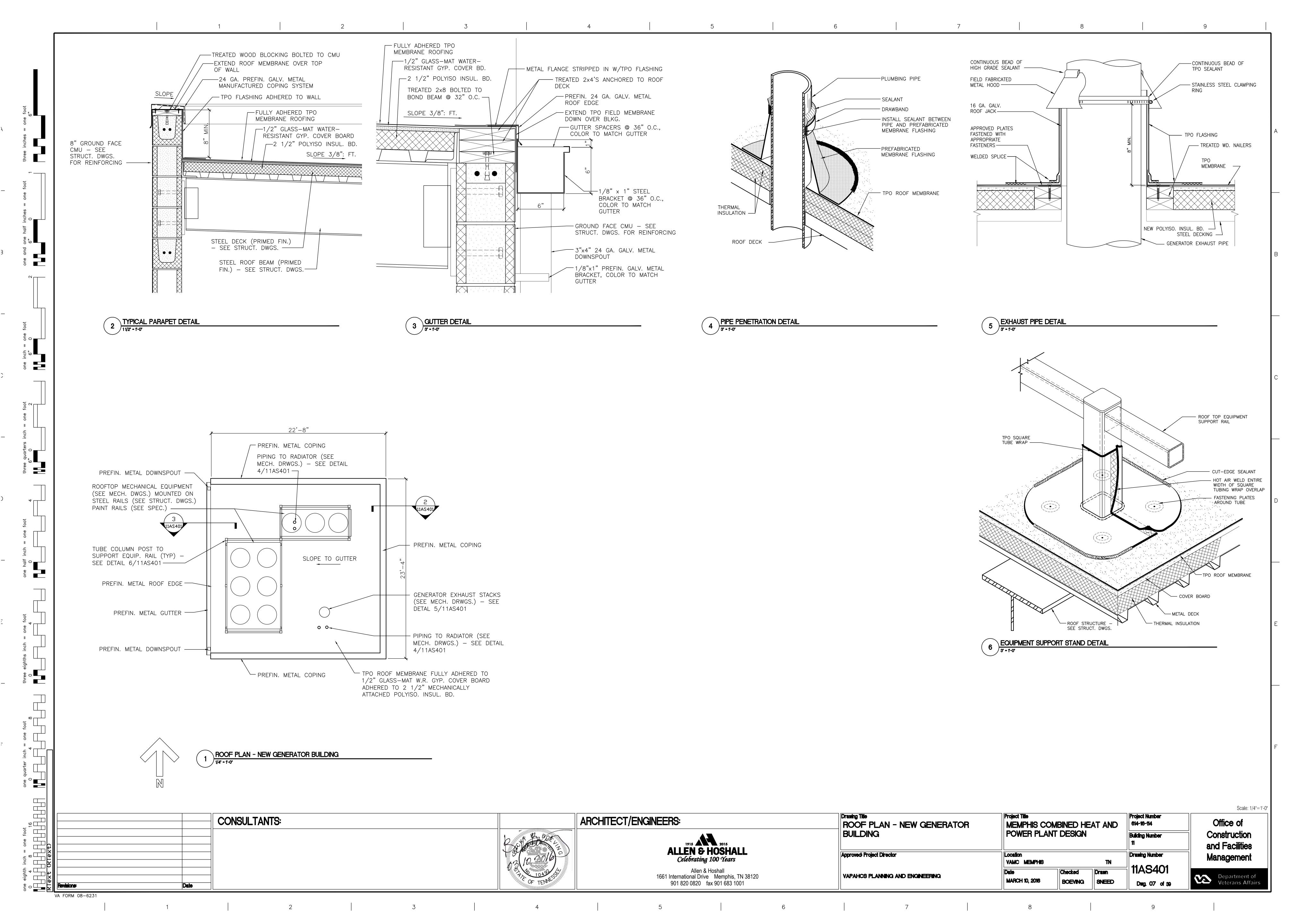
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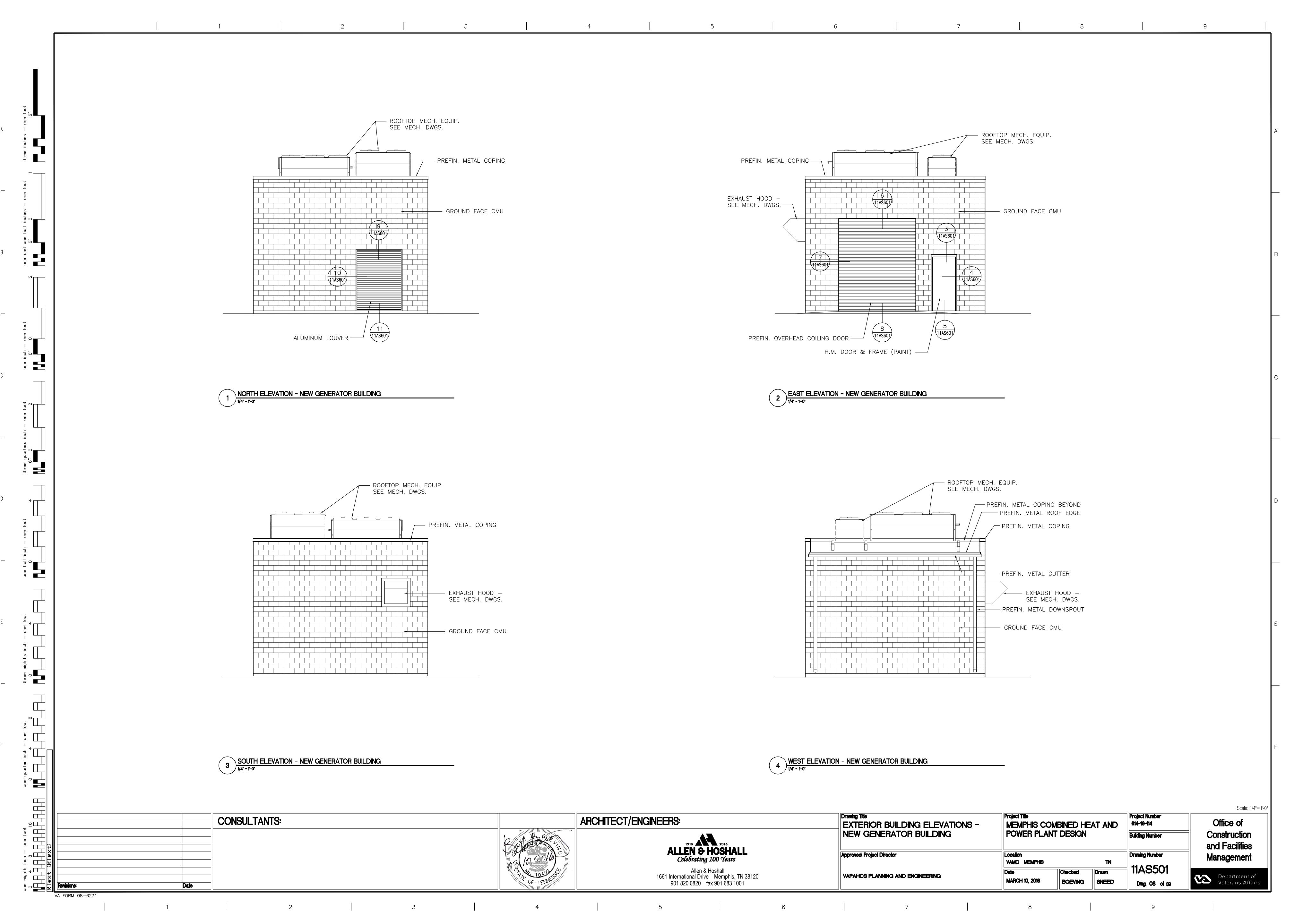
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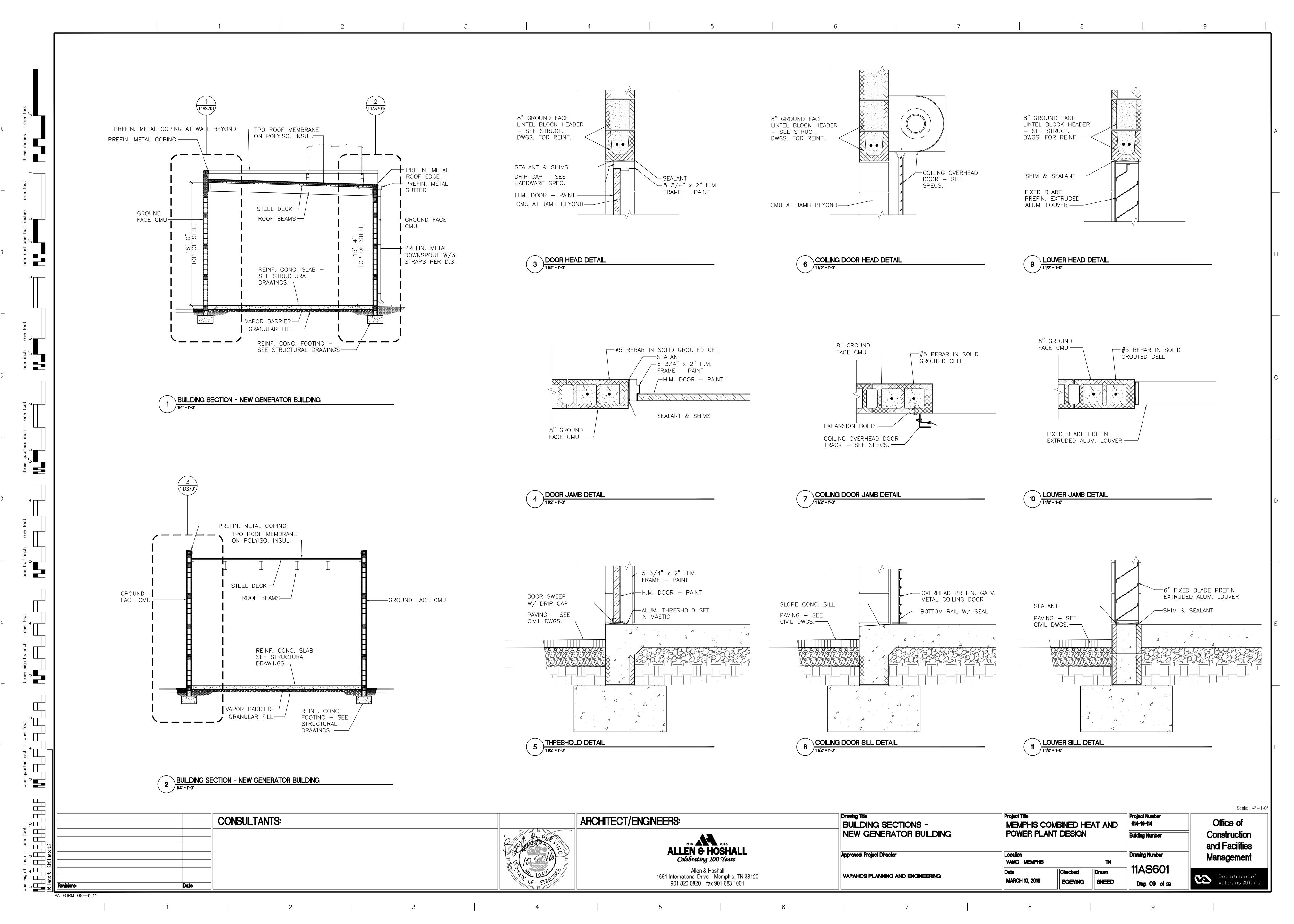
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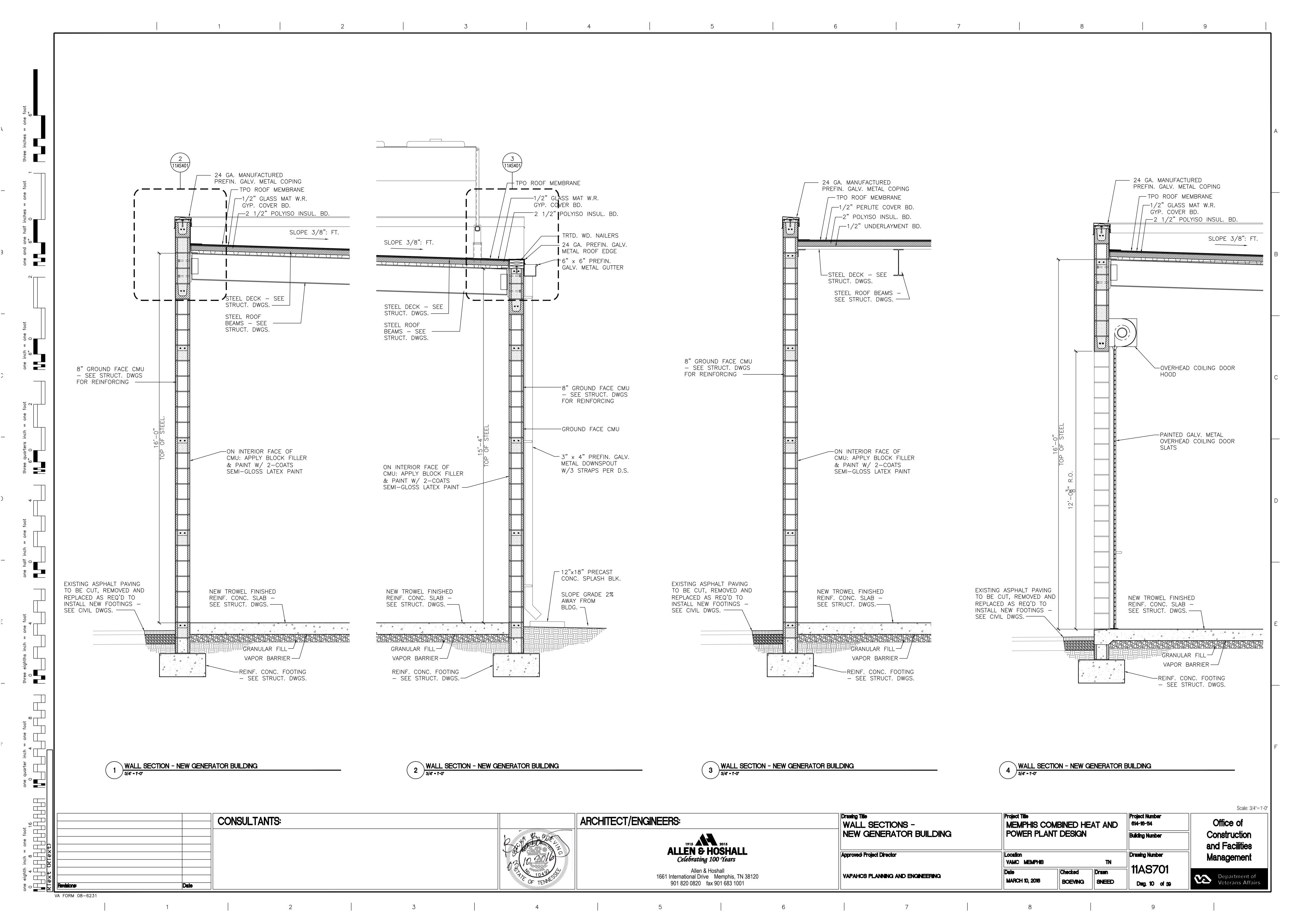
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ABBREVIATIONS ADJACENT ABOVE FINISHED FLOOR APPROX APPROXIMATE(LY) ARCH ARCHITECTURAL BOTTOM CHORD BUILDING BFAM BTM BOTTOM BASE PLATE BEARING BOTH SIDES **BOTH WAYS** COMPRESSION CHANNEL CONSTRUCTION JOINT CENTERLINE CLEAR OR CLEARANCE CONCRETE MASONRY UNIT COLUMN CONCRETE CONN CONNECTION CONSTRUCTION CONTINUOUS COORD COORDINATE DIAMETER DIMENSION DRAWING DOWEL **EACH FACE** ELECTRICAL **ELEVATION** 9. THE CONTRACTOR SHALL NOTIFY, IN WRITING, THE ENGINEER OF CONDITIONS ENCOUNTERED IN THE **EMBEDMENT EQUIPMENT** EQUIP EACH WAY **EXISTING** EXPANSION **EXTERIOR** FOUNDATION FINISHED FLOOR ELEVATION FULL PENETRATION FAR SIDE FTG FOOTING GAGE OR GAUGE GALVANIZED HORIZONTAL HEADED STUD INSULATION INTERIOR JOINT KIPS (1000 LBS.) KSI KIPS PER SQUARE INCH POUNDS DEVELOPMENT LENGTH LIVE LOAD LONG LEG HORIZONTAL LONG LEG VERTICAL LONGITUDINAL LIGHTWEIGHT CONCRETE MANUFACTURER MATERIAL MAX MAXIMUM MECHANICAL MEZZANINE MIDDLE MID MIN MINIMUM MISCELLANEOUS METAL 2. ALLOWABLE SOIL BEARING PRESSURES USED IN DESIGN: NOT APPLICABLE **NEAR SIDE** NOT TO SCALE ON CENTER THAT THE FOUNDATION MATERIALS ARE CONSISTENT WITH ABOVE STATED ASSUMED SOIL OUTSIDE FACE OPNG OPENING OPPOSITE PERPENDICULAR PRE-ENGINEERED METAL BUILDING PRELIM PRELIMINARY PROJECTION POUNDS PER SQUARE FOOT POUNDS PER SQUARE INCH ROOF DRAIN REINFORCING (-ED, -MENT) REQUIRED REVISION RETAINING WALL SCHED SCHEDULE (D) SECTION SPECIFICATIONS(S) STAINLESS STEEL STRUCT STRUCTURE SYMMETRICAL SYM TOP, TENSION TOP OF TOP OF CONCRETE TOP OF FOOTING T/SLAB TOP OF SLAB TOP & BOTTOM **TEMPERATURE** THICKNESS TOP OF STEEL TOP OF WALL **TRANSVERSE** TYPICAL UNLESS NOTED OTHERWISE VERTICAL W/O WITHOUT WORK POINT WELDED WIRE FABRIC

GENERAL NOTES

- 1. NO PROVISION OF ANY REFERENCED STANDARD SPECIFICATION, MANUAL OR CODE (WHETHER OR NOT SPECIFICALLY INCORPORATED BY REFERENCE IN THE CONTRACT DOCUMENTS) SHALL BE EFFECTIVE TO CHANGE THE DUTIES AND RESPONSIBILITIES OF THE OWNER, CONTRACTOR, ARCHITECT, ENGINEER, SUPPLIER, OR ANY OF THE CONSULTANTS, AGENTS, OR EMPLOYEES FROM THOSE SET FORTH IN THE CONTRACT DOCUMENTS, NOR SHALL IT BE EFFECTIVE TO ASSIGN TO THE STRUCTURAL ENGINEER OF RECORD (S.E.R.) OR ANY OF THE S.E.R.'S CONSULTANTS, AGENTS, OR EMPLOYEES ANY DUTY OR AUTHORITY TO SUPERVISE OR DIRECT THE FURNISHING OR PERFORMANCE OF THE WORK OR ANY DUTY OR AUTHORITY TO UNDERTAKE RESPONSIBILITIES CONTRARY TO THE PROVISIONS OF THE CONTRACT DOCUMENTS.
- 2. REFERENCE TO STANDARD SPECIFICATIONS (CONCERNING STRUCTURAL DESIGN) OF ANY TECHNICAL SOCIETY, ORGANIZATION, OR ASSOCIATION OR TO CODES OF LOCAL OR STATE AUTHORITIES, SHALL MEAN THE LATEST STANDARD CODES, SPECIFICATION OR TENTATIVE SPECIFICATION ADOPTED AT THE DATE OF TAKING BIDS, UNLESS SPECIFICALLY STATED
- 3. IN THE EVENT CONTRACT DOCUMENTS CONFLICT WITH THE CODE OF PRACTICE OR SPECIFICATIONS OF ACI, PCI, AISC, AISI, SJI OR OTHER STANDARDS, CONTACT STRUCTURAL ENGINEER FOR CLARIFICATION.
- 4. NOTES AND SPECIFIC DETAILS ON THE DRAWINGS SHALL TAKE PRECEDENCE OVER GENERAL STRUCTURAL NOTES AND TYPICAL DETAILS. CONTACT THE ARCHITECT / ENGINEER FOR A DETERMINATION OF INTENT BEFORE PROCEEDING WITH RELATED WORK IF THERE IS ANY DISCREPANCY OR QUESTION REGARDING WHICH NOTE TO FOLLOW.
- 5. MATERIAL, WORKMANSHIP, AND DESIGN SHALL CONFORM TO THE REFERENCED BUILDING CODE
- 6. THE CONTRACTOR SHALL VERIFY THE DIMENSIONS, ELEVATIONS AND SITE CONDITIONS BEFORE STARTING WORK. THE ARCHITECT / ENGINEER SHALL BE NOTIFIED OF ANY DISCREPANCY.
- 7. THE DESIGN, ADEQUACY, AND SAFETY OF ERECTION BRACING, SHORING, TEMPORARY SUPPORTS, ETC. IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
- 8. THE CONTRACTOR SHALL COORDINATE THE ARCHITECTURAL, MECHANICAL, ELECTRICAL, PLUMBING AND CIVIL WORKS WITH THE STRUCTURAL CONTRACT DOCUMENTS. THE ARCHITECT / ENGINEER SHALL BE NOTIFIED OF ANY DISCREPANCIES OR OMISSIONS.
- FIELD THAT ARE CONTRADICTORY TO THOSE SHOWN ON THE CONTRACT DOCUMENTS. 10. FOR DIMENSIONS NOT SHOWN ON THE STRUCTURAL DRAWINGS SEE THE ARCHITECTURAL

DESIGN CRITERIA

- 1. 2012 INTERNATIONAL BUILDING CODE (IBC)
- 2. LIVE LOADS (REDUCED AS ALLOWED BY THE BUILDING CODE): A. ROOF = 20 PSF

3.	DEAD	LOADS:

- A. ROOF:
- 20 PSF 4. SNOW LOADS: A. GROUND SNOW LOAD: PG = 10 PSF
- B. SNOW IMPORTANCE FACTOR: 5. WIND LOADS:
- A. BASIC WIND SPEED (3 SECOND GUST): 120 MPH C. WIND EXPOSURE: D. INTERNAL PRESSURE COEFFICIENT: E. COMPONENTS AND CLADDING PRESSURE: +21 PSF, -39 PSF
- 5. SEISMIC LOADS: A. RISK CATEGORY:
- B. SPECTRAL RESPONSE COEFFICIENTS: C. SOIL SITE CLASS:
- D. SEISMIC DESIGN CATEGORY: E. RESPONSE MODIFICATION FACTOR:
- G. SYSTEM OVERSTRENGTH FACTOR: . DESIGN BASE SHEAR:
- Sds = 0.721; Sdl = 0.390
- F. DEFLECTION AMPLIFICATION FACTOR:

- SPECIAL REINFORCED MASONRY SHEAR WALLS EQUIVALENT LATERAL FORCE J. ANALYSIS PROCEDURE:

SHALLOW FOUNDATIONS (PSI PROJECT # 05021341 DATED 1/14/2016)

- 1. FOUNDATIONS ARE DESIGNED BASED UPON ASSUMED SOIL BEARING CAPACITIES AS STATED
- B. CONTINUOUS FOOTINGS: 2000 PSF 3. FOOTING EXCAVATIONS SHALL BE OBSERVED AND TESTED BY AN EXPERIENCED GEOTECHNICAL ENGINEER PRIOR TO STEEL OR CONCRETE PLACEMENT IN ORDER TO ASSESS
- BEARING CAPACITIES. 4. IN THE EVENT THAT THE SOILS TEST RESULTS ARE DISAPPROVED, FOOTING EXCAVATIONS SHALL BE UNDERCUT (UNDER THE DIRECTION OF THE SOILS ENGINEER) UNTIL SOILS OF ADEQUATE BEARDING CAPACITY ARE ENCOUNTERED. BACKFILL UNDER FOOTINGS SHALL CONSIST OF CONCRETE F'C = 2500 PSI @ 28 DAYS PLACED UP TO THE PROPOSED BOTTOM OF
- 5. FOOTINGS SHALL BEAR ON UNDISTURBED RESIDUAL SOILS OR COMPACTED FILL, MAXIMUM
- DENSITY OF 98% ASTM D-698. 6. FOOTING ELEVATIONS SHOWN ON THE PLANS ARE FOR ESTIMATING PURPOSES ONLY. ACTUAL FOOTING ELEVATIONS SHALL BE DETERMINED BY THE CONTRACTOR AT THE SITE AND SHALL BE A MINIMUM OF 14" BELOW FINISHED GRADE.
- 7. ALL WATER SHALL BE REMOVED FROM FOUNDATION EXCAVATIONS PRIOR TO PLACING OF CONCRETE. IF BOTTOMS OF TRENCHES BECOME SOFTENED DUE TO WATER BEFORE FOOTINGS ARE CAST, THE CONTRACTOR, AT HIS OWN EXPENSE, SHALL EXCAVATE THE SOFTENED MATERIAL AND REPLACE WITH CONCRETE.
- 8. ALL PIPES (WATER LINES, SEWER LINES, ETC.) AND CONDUITS RUNNING THROUGH WALLS / SLABS SHALL BE PROTECTED WITH 1/2" EXPANSION MATERIAL.
- 9. CONTINUOUS FOOTING PERPENDICULAR TO PIPE RUNS SHALL BE EITHER LOWERED TO ALLOW PIPES TO PASS THROUGH ABOVE SUCH FOOTINGS OR HAVE CONCRETE JACKET IF PIPES ARE LOW ENOUGH TO BE PLACED BELOW SUCH FOOTINGS. FOOTINGS PARALLEL TO PIPE RUNS SHALL BE LOWERED TO AVOID SURCHARGE ONTO THE TRENCH EXCAVATIONS.
- 10. REFER TO CIVIL/ARCHITECTURAL PLANS FOR LIMITS OF EXCAVATION.

STRUCTURAL STEEL

- 1. STRUCTURAL STEEL SHALL CONFORM TO ASTM A992, UNLESS NOTED OTHERWISE. PIPE COLUMNS SHALL CONFORM TO ASTM A53 TYPE E OR S GRADE B. TUBES SHALL CONFORM TO ASTM A500 GRADE B.
- 2. DESIGN, FABRICATION, AND ERECTION SHALL BE IN ACCORDANCE WITH AISC SPECIFICATION FOR THE DESIGN, FABRICATION, AND ERECTION OF STRUCTURAL STEEL
- 3. STRUCTURAL STEEL SHALL BE DETAILED IN ACCORDANCE WITH STANDARD PRACTICES A. CONNECTIONS: AISC MANUAL STANDARD CONNECTIONS. UNLESS NOTED B. HIGH-STRENGTH BOLTS: ASTM A325 BEARING TYPE N INSTALLED IN ACCORDANCE
- WITH "SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS", RESEARCH COUNCIL ON RIVETED AND BOLTED STRUCTURAL JOINTS. 4. ALL WELDS MUST BE MADE IN ACCORDANCE WITH THE AMERICAN WELDING SOCIETY
- 5. FIELD AND SHOP CONNECTIONS SHALL BE WELDED AS SHOWN ON DRAWINGS OR BOLTED
- WITH HIGH STRENGTH BOLTS, UNLESS NOTED OTHERWISE. 6. SEE ARCHITECTURAL DRAWINGS FOR ANGLES, CLIPS, BARS, PLATES, AND OTHER ITEMS
- ATTACHED TO STRUCTURAL MEMBERS, AND FOR CHAMFERS ON CONCRETE WALLS, BEAMS, ETC.
- 7. PROVIDE TEMPORARY BRACING AS REQUIRED MAINTAINING ALIGNMENT AND SECURITY OF STRUCTURES DURING CONSTRUCTION.
- 8. DO NO CUTTING, DRILLING OR MODIFYING OF STRUCTURAL MEMBERS WITHOUT THE APPROVAL OF THE ENGINEER.
- 9. $\,$ THE MANUFACTURER'S NAME, BRAND OR TRADEMARK (MILL IDENTIFICATION MARKS) SHALL BE SHOWN IN RAISED LETTERS AT INTERVALS ALONG THE LENGTH. (ASTM A6/A6M 96-97. PARAGRAPH 12.2) NOTE: FOR BEAMS WITH THE GREATEST CROSS-SECTIONAL DIMENSION NOT EXCEEDING (6") SIX INCHES, THE PRODUCER OR PROCESSOR HAS THE OPTION OF MARKING OR TAGGING A BUNDLE OF SUCH BEAMS WITH THE ABOVE INFORMATION

- 1. CONCRETE MASONRY UNITS FOR LOAD BEARING WALLS SHALL HAVE A MINIMUM COMPRESSIVE A. HOLLOW UNITS: ASTM C90 GRADE N, LIGHTWEIGHT TYPE 1 (MOISTURE CONTROLLED) B. SOLID UNITS: ASTM C145 GRADE N, TYPE 1 (MOISTURE CONTROLLED)
- 2. CONCRETE MASONRY UNITS SHALL BE LAID WITH TYPE M OR S MORTAR.
- 3. GROUT FOR REINFORCED MASONRY: ASTM C476 (2000 PSI)
- 4. REINFORCEMENT: A. HORIZONTAL JOINTS:STANDARD DUR-O-WALL OR EQUIVALENT TRUSS OR TRI-ROD REINFORCEMENT AT 16"O.C. UNLESS NOTED OTHERWISE B. VERTICAL AND HORIZONTAL REINFORCEMENASTM A615, GRADE 60
- 5. CONSTRUCTION OF ALL CONCRETE MASONRY SHALL CONFORM TO THE LATEST EDITION OF
- 6. GROUT SOLID ALL CELLS CONTAINING REINFORCING AND ALL CELLS BELOW GRADE.
- 7. CONTROL JOINTS: SPACING SHALL NOT EXCEED 30'-0" OR 3 TIMES THE WALL HEIGHT WHICHEVER IS LESSER, UNLESS NOTED OTHERWISE.
- 8. GROUT ALL BEAM AND JOIST POCKETS SOLID AFTER INSTALLATION OF BEAMS AND JOISTS.
- 9. MINIMUM LAP OF REINFORCING STEEL SHALL BE 50 BAR DIAMETERS FOR TYPICAL REINFORCING AND 50 BAR DIAMETERS FOR ALL JAMB BARS SHOWN ON WALL ELEVATIONS OR 2'-0" MINIMUM.
- 10. MAXIMUM HEIGHT OF GROUT POUR SHALL BE 4'-0".
- 11. PROVIDE 1/4" CLEARANCE FROM INSIDE FACE OF BLOCK MASONRY CELLS AND MINIMUM OF ONE BAR DIAMETER, BUT NOT LESS THAN 3/4" CLEAR DISTANCE BETWEEN PARALLEL BARS.
- 12. ALL VERTICAL REINFORCING STEEL SHALL BE POSITIONED AND HELD IN PLACE BY MEANS OF WIRE SPACERS.

METAL DECKING

- I. PROVIDE DESIGN, FABRICATION, AND ERECTION OF METAL DECK CONFORMING TO THE STEEL DECK INSTITUTE'S "CODE OF RECOMMENDED STANDARD PRACTICE AND BASIC DESIGN SPECIFICATIONS".
- 2. FORM ROOF DECK FROM STEEL SHEETS CONFORMING TO ASTM A611 OR A653 OR HIGHER SPECIFICATIONS WITH MINIMUM YIELD STRENGTH OF 33 KSI.
- 3. ATTACH SHEETS TO STEEL SUPPORT MEMBERS AS INDICATED AND IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS FOR INSTALLATION. WHEN DECK IS SCHEDULED TO BE EXPOSED,
- DE-SLAG, CLEAN AND TOUCHED UP WELDS WITH A ZINC-RICH PRIMER. 4. LAP ROOF ENDS MINIMUM OF 2 INCHES WHEN FASTENING DECK TO SUPPORT MEMBERS PROVIDE
- WELDING MATERIALS INSTALLATION PROCEDURES TO PREVENT BURNING OF HOLES IN DECK. 5. METAL DECK FABRICATOR TO FURNISH SHOP DRAWINGS FOR STRUCTURAL ENGINEER'S REVIEW
- PRIOR TO FABRICATION. SHOP DRAWINGS SHALL INCLUDE SUPPORT CONNECTIONS, SIDE LAP CONNECTIONS, COATING MATERIAL AND ERECTION SEQUENCE. 6. ROOF DECK SHALL HAVE THE FOLLOWING MINIMUM SECTION PROPERTIES.
- A. SECTION PROPERTIES (PER FOOT OF WIDTH). 20 GAUGE: lp = .201 in^4; Sp = .234 in^3; Sn = .247 in^3
- 7. DIAPHRAGM PERIMETER ANGLES SHALL BE FULLY CONTINUOUS ALONG LENGTH OF WALL

REINFORCING

- 1. REINFORCING SHALL BE DETAILED AND PLACED IN CONFORMANCE WITH ACI DETAILING MANUAL
- 2. REINFORCING BARS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A615 GRADE 60 EXCEPT ALL REINFORCING IN CONCRETE MOMENT FRAMES AND SHEAR WALLS AND ALL WELDED REINFORCEMENT SHALL CONFORM TO ASTM A706
- 3. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A185.
- 4. MINIMUM LAP OF WELDED WIRE FABRIC SHALL BE 6" OR ONE FULL MESH + 2", WHICHEVER IS GREATER.
- 5. $\,$ DOWELS BETWEEN FOOTINGS AND WALLS SHALL BE THE GRADE, SIZE AND SPACING OR NUMBER AS THE VERTICAL
- REINFORCING, RESPECTIVELY. 6. REINFORCING STEEL IN ALL CONCRETE WALLS AND FOOTINGS SHALL BE CONTINUOUS AROUND CORNERS.
- 7. PROVIDE (2) #5 EXTRA REINFORCING BARS AROUND ALL SIDE OF OPENINGS IN CONCRETE, UNLESS NOTED OTHERWISE ON THE PLANS. EXTEND BARS 2'-0" BEYOND EACH EDGE OF OPENING.
- 8. MINIMUM CLEAR COVERAGE OF CONCRETE OVER REINFORCEMENT SHALL BE:
- A. CONCRETE CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH: 3" B. CONCRETE EXPOSED TO EARTH OR WEATHER: i. NO. 6 THROUGH NO. 18 BAR: 2"
- ii. NO. 5 BAR, W31 OR D31 WIRE OR SMALLER: 1-1/2" c. CONCRETE NOT EXPOSED TO WEATHER OR IN CONTACT WITH GROUND: . SLABS WALLS AND JOISTS NO. 14 & NO. 18: 1-1/2"

_	MS, COLUMNS: TIES AND	O. 11 & SMALLER: 3/4") PRIMARY REINFORCING	i:
F	REINFORCING EMB DEVELOPMENT L	· ·	
	f'c = 3000 PSI	f'c = 4500 PSI	

Ldh

14"

25"

28"

29"

42"

		HOOK BAR DET	AILS
	CRITICAL SECTION		
· · · · · · · · · · · · · · · · · · ·	12*db	2 1/2" MIN. 6*d _b	_

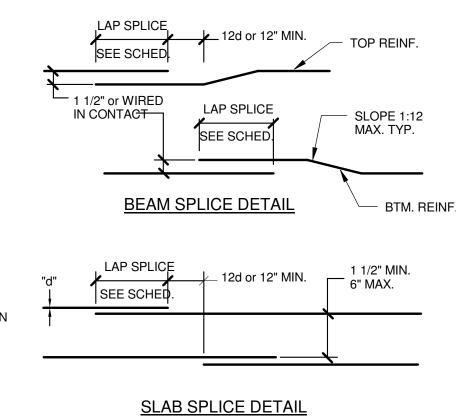
1. Fv = 60 ksi.2. Ld = STRAIGHT BAR DEVELOPMENT LENGTH. 3. Ldh = DEVELOPMENT LENGTH w/ STANDARD HOOK. $d_b = BAR DIAMETER$

_	REINFORCING LAP SPLICE LENGTH SCHEDULE					
BAR SIZE	f'c = 3000 PSI	f'c = 4500 PSI				
#3	16"	16"				
#4	18"	16"				
#5	22"	19"				
#6	26"	23"				
#7	38"	31"				
#8	43"	35"				
#9	49"	40"				
#10	55"	45"				
#11	61"	50"				

 FY = 60 ksi SPLICE LENGTHS ARE FOR NORMAL WEIGHT CONCRETE. . ALL SPLICES SHALL BE STAGGERED AS SHOWN. IF MORE THAN 50% OF THE REINFORCING IS LAP SPLICED WITHIN THE

SHALL BE INCREASED BY 33%. 4. LAP LENGTHS SPECIFICALLY DETAILED IN DRAWINGS SHALL GOVERN IN LIEU OF SCHEDULE. 5. SMALLER BAR REQUIRED LAP LENGTH SHALL BE USED WHEN SPLICING WITH A LARGER BAR.

REQUIRED LAP SPLICE LENGTH, THE LAP SPLICE LENGTH



CONCRETE

- 1. ALL PHASES OF WORK PERTAINING TO THE CONCRETE CONSTRUCTION SHALL CONFORM TO THE "BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE" (ACI 318), LATEST EDITION WITH MODIFICATIONS AS NOTED IN THE DRAWINGS OR SPECIFICATIONS.
- 2. CONCRETE MIXES SHALL BE DESIGNED BY A QUALIFIED TESTING LABORATORY AND APPROVED BY THE STRUCTURAL ENGINEER.
- 3. ALL EXPOSED CORNERS OR EDGES OF COLUMNS, PIERS, WALLS, ETC., SHALL BE FORMED WITH A 3/4" CHAMFER UNLESS NOTED OTHERWISE ON STRUCTURAL OR ARCHITECTURAL DRAWINGS.
- 5. PROVIDE SLEEVES FOR PLUMBING AND ELECTRICAL OPENINGS IN CONCRETE BEFORE PLACING CONCRETE. DO NOT CUT ANY REINFORCING THAT MAY CONFLICT. CORING IS NOT PERMITTED EXCEPT AS SHOWN. NOTIFY THE STRUCTURAL ENGINEER IN ADVANCE OF CONDITIONS NOT SHOWN ON DRAWINGS.

4. ALL REINFORCING BARS, ANCHOR BOLTS AND OTHER CONCRETE INSERTS SHALL BE WELL SECURED IN POSITION PRIOR TO PLACING CONCRETE.

- 6. CONDUIT OR PIPE SIZE (O.D.) SHALL NOT EXCEED 30% OF THE SLAB THICKNESS AND SHALL BE PLACED BETWEEN THE TOP AND BOTTOM REINFORCING UNLESS SPECIFICALLY DETAILED OTHERWISE. CONCENTRATIONS OF CONDUITS OR PIPES SHALL BE AVOIDED EXCEPT WHERE DETAILED OPENINGS ARE PROVIDED.
- 7. CURING COMPOUNDS ON CONCRETE THAT IS TO RECEIVE SPECIAL FINISH SHALL BE APPROVED BY THE MANUFACTURER BEFORE USE
- 8. ROUGHEN SURFACE OF HORIZONTAL OR NEARLY HORIZONTAL CONSTRUCTION JOINTS SO THAT THE AGGREGATE SHALL BE EXPOSED UNIFORMLY, LEAVING NO LAITANCE, LOOSED PARTICLES OR DAMAGED CONCRETE.
- 9. LOCATE JOINTS NOT INDICATED TO LEAST IMPAIR STRENGTH AND APPEARANCE OF THE STRUCTURE. LOCATE HORIZONTAL JOINTS IN CONCRETE ONLY WHERE THEY NORMALLY OCCUR OR WHERE INDICATED. LOCATE VERTICAL JOINTS IN MIDDLE THIRD OF SPANS OF SLABS, BEAMS, OR GIRDERS UNLESS A BEAM INTERSECTS A GIRDER AT MIDDLE LOCATION, IN WHICH CASE OFFSET JOINTS IN GIRDERS TWICE THE WIDTH OF THE
- 10. ONCE FORMWORK HAS BEEN REMOVED FROM CONCRETE RETAINING WALLS, BRACE WALLS THOROUGHLY BEFORE PLACING SOIL AGAINST WALL AND KEEP BRACING IN PLACE FOR A MINIMUM OF 7 DAYS AFTER EARTHWORK IS COMPLETE.

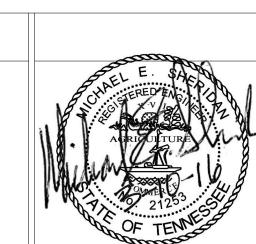
SCHEDULE OF CONCRETE STRENGTHS						
USE (LOCATION)	28 Day Strength	Aggregate Size (Max.)	Cement/CY (Min.)	W/C ratio (Max.)	Slump (Max.)	Air Entrainment
SLAB-ON-GRADE (INTERIOR)	f'c=3,000 psi	1"	480#	.62	4-1/2"	NONE
EXPOSED CONCRETE	f'c=4,500 psi	1"	560#	.54	4-1/2"	4.5%-6%
FOOTINGS	f'c=3,000 psi	1"	480#	.62	4-1/2"	NONE

STRUCTURAL DRAWING LIST STRUCTURAL GENERAL NOTES

STATEMENT OF SPECIAL INSPECTIONS STRUCTURAL SPECIAL INSPECTIONS 11SS0.3 FOUNDATION AND FRAMING PLANS 11SS1.1 11SS3.1 BUILDING SECTIONS

11SS5.1 STRUCTURAL DETAILS & SCHEDULES 11SS5.2 STRUCTURAL DETAILS

CONSULTANTS:



ARCHITECT/ENGINEERS: ALLEN & HOSHALL Celebrating 100 Years

> Allen & Hoshall 1661 International Drive Memphis, TN 38120

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Drawing Title Project Title Project Number MEMPHIS COMBINED HEAT AND STRUCTURAL GENERAL NOTES 614-16-114 POWER PLANT DESIGN **Building Number** Approved: Project Director Drawing Number VAMC MEMPHIS 11SS_{0.1} VAPAHCS PLANNING AND ENGINEERING PM **CWS** MARCH 10, 2016 Dwg. 11 of 39

Office of Construction and Facilities Management Department of

Veterans Affairs

VA FORM 08-623

DSTATEMENT OF SPECIAL INSPECTIONS AGREEMENT

TO PERMIT APPLICANTS OF PROJECTS REQUIRING SPECIAL INSPECTION AND/OR TESTING IN ACCORDANCE WITH SECTION 1704 OF THE INTERNATIONAL BUILDING

PROJECT ADDRESS: 1030 JEFFERSON AVE, MEMPHIS, TN 38104

PERMIT NO:

VA FORM 08-6231

APPROVAL OF SPECIAL INSPECTORS: SPECIAL INSPECTORS SHALL HAVE NO FINANCIAL INTEREST IN PROJECTS FOR WHICH THEY PROVIDE SPECIAL INSPECTION. SPECIAL INSPECTORS SHALL BE APPROVED BY THE BUILDING DEPARTMENT PRIOR TO PERFORMING ANY DUTIES. SPECIAL INSPECTORS SHALL SUBMIT THEIR QUALIFICATIONS AND ARE SUBJECT TO PERSONAL INTERVIEWS FOR PREQUALIFICATION. SPECIAL INSPECTORS SHALL DISPLAY APPROVED IDENTIFICATION, AS STIPULATED BY THE BUILDING OFFICIAL, WHEN PERFORMING THE FUNCTION OF SPECIAL INSPECTOR.

SPECIAL INSPECTION AND TESTING SHALL MEET THE MINIMUM REQUIREMENTS OF SECTIONS 1704 AND 1705 OF THE IBC. THE FOLLOWING CONDITIONS ARE ALSO APPLICABLE:

A) DUTIES AND RESPONSIBILITIES OF THE SPECIAL INSPECTOR

- 1) GENERAL REQUIREMENTS. SPECIAL INSPECTORS SHALL REVIEW APPROVED PLANS AND SPECIFICATIONS FOR SPECIAL INSPECTION REQUIREMENTS. SPECIAL INSPECTORS SHALL COMPLY WITH THE SPECIAL INSPECTION REQUIREMENTS OF THE ENFORCING JURISDICTION FOUND IN THE STATEMENT OF SPECIAL INSPECTIONS, INCLUDING WORK AND MATERIALS.
- 2) SIGNIFY PRESENCE AT JOB SITE. SPECIAL INSPECTORS SHALL NOTIFY CONTRACTOR PERSONNEL OF THEIR PRESENCE AND RESPONSIBILITIES AT THE JOB SITE. IF REQUIRED BY THE BUILDING OFFICIAL, THEY SHALL SIGN IN ON THE APPROPRIATE FORM POSTED WITH THE BUILDING PERMIT.
- 3) OBSERVE ASSIGNED WORK. SPECIAL INSPECTORS SHALL INSPECT ALL WORK ACCORDING THE STATEMENT OF SPECIAL INSPECTIONS FOR WHICH THEY ARE RESPONSIBLE FOR COMPLIANCE WITH THE BUILDING-DEPARTMENT-APPROVED (STAMPED) PLANS AND SPECIFICATIONS, AND THE APPLICABLE PROVISIONS OF SECTION 1704 OF THE IBC.
- 4) REPORT NONCONFORMING ITEMS (DISCREPANCIES). SPECIAL INSPECTORS SHALL BRING ALL NONCONFORMING ITEMS TO THE IMMEDIATE ATTENTION OF THE CONTRACTOR. IF ANY SUCH ITEM IS NOT RESOLVED IN A TIMELY MANNER OR IS ABOUT TO BE INCORPORATED INTO THE WORK, THE DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE AND THE BUILDING OFFICIAL SHALL BE NOTIFIED IMMEDIATELY AND THE ITEM NOTED IN THE SPECIAL INSPECTOR'S WRITTEN REPORT (SEE SECTION 1704.2.4). THE SPECIAL INSPECTOR SHALL INCLUDE IN THE REPORT AT A MINIMUM THE FOLLOWING FOR EACH NONCONFORMING ITEM:
- DESCRIPTION AND EXACT LOCATION.
 REFERENCE TO APPLICABLE DETAIL OF APPROVED
- PLANS/SPECIFICATIONS.

 NAME AND TITLE OF EACH INDIVIDUAL NOTIFIED AND METHOD OF
- NOTIFICATION.
 RESOLUTION OF CORRECTIVE ACTION TAKEN.

COMPLETE WRITTEN INSPECTION REPORTS FOR EACH INSPECTION VISIT AND PROVIDE THE REPORTS ON A TIMELY BASIS AS DETERMINED BY THE BUILDING OFFICIAL. THE SPECIAL INSPECTOR OR INSPECTION AGENCY SHALL FURNISH THESE REPORTS DIRECTLY TO THE BUILDING OFFICIAL, AS REQUIRED BY THE BUILDING OFFICIAL, AND TO THE DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE (SEE SECTION 1704.2.4). THE REPORTS SHOULD BE ORGANIZED ON A DAILY FORMAT AND MAY BE SUBMITTED WEEKLY AT THE OPTION OF THE BUILDING OFFICIAL. IN THESE

5) PROVIDE TIMELY PROGRESS REPORTS. THE SPECIAL INSPECTOR SHALL

- REPORTS, SPECIAL INSPECTORS SHOULD:

 DESCRIBE INSPECTIONS AND TESTS MADE WITH APPLICABLE
- LOCATIONS.
 INDICATE NONCONFORMING ITEMS (DISCREPANCIES) AND HOW THEY WERE RESOLVED.
- LIST UNRESOLVED ITEMS, PARTIES NOTIFIED, AND TIME AND METHOD OF NOTIFICATION.
- ITEMIZE CHANGES AUTHORIZED BY THE DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE IF NOT INCLUDED IN NONCONFORMING ITEMS.
- 6) SUBMIT FINAL REPORT. SPECIAL INSPECTORS OR INSPECTION AGENCIES SHALL SUBMIT A FINAL SIGNED REPORT TO THE BUILDING DEPARTMENT, AS REQUIRED BY THE BUILDING DEPARTMENT, STATING THAT ALL ITEMS REQUIRING SPECIAL INSPECTION AND TESTING BY THE STATEMENT OF SPECIAL INSPECTIONS WERE FULFILLED AND REPORTED, AND, TO THE BEST OF THE INSPECTOR'S KNOWLEDGE, CONFORM TO THE APPROVED PLANS AND SPECIFICATIONS (SEE SECTION 1704.2.4). ITEMS NOT IN CONFORMANCE, UNRESOLVED ITEMS OR ANY DISCREPANCIES IN INSPECTION COVERAGE (i.e. MISSED INSPECTIONS, PERIODIC INSPECTION WHEN CONTINUOUS WAS REQUIRED, etc.) SHALL BE SPECIFICALLY

B) OWNER RESPONSIBILITIES

THE PROJECT OWNER OR AN AGENT OF THE OWNER SHALL BE RESPONSIBLE FOR FUNDING SPECIAL INSPECTION SERVICES. MEASURES SHALL BE TAKEN TO ENSURE THAT THE SCOPE OF WORK AND DUTIES OF THE SPECIAL INSPECTION AS OUTLINED IN THE STATEMENT OF SPECIAL INSPECTIONS ARE NOT COMPROMISED.

C) CONTRACTOR RESPONSIBILITIES

ITEMIZED IN THIS REPORT.

- 1) CONTRACTOR SHALL SUBMIT A WRITTEN STATEMENT OF RESPONSIBILITY TO THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE, BUILDING OFFICIAL, AS REQUIRED BY THE BUILDING OFFICIAL, AND TO THE OWNER, AS REQUIRED BY THE OWNER, PRIOR TO COMMENCEMENT OF THE WORK ON THE SYSTEM OR COMPONENT. THE CONTRACTOR'S
- STATEMENT OF RESPONSIBILITY SHALL CONTAIN THE FOLLOWING:
 ACKNOWLEDGEMENT OF AWARENESS OF THE SPECIAL REQUIREMENTS CONTAINED IN THE STATEMENT OF SPECIAL
- INSPECTIONS,
 ACKNOWLEDGEMENT THAT CONTROL SHALL BE EXERCISED TO OBTAIN COMPLIANCE WITH THE CONSTRUCTION DOCUMENTS
- APPROVED BY THE BUILDING OFFICIAL,
 PROCEDURES FOR EXERCISING CONTROL WITHIN THE CONTRACTOR'S ORGANIZATION, THE METHOD AND FREQUENCY OF

REPORTING, AND THE DISTRIBUTION OF REPORTS, AND

 IDENTIFICATION AND QUALIFICATIONS OF THE PERSON(S) EXERCISING SUCH CONTROL AND THE POSITION(S) IN THE ORGANIZATION.

- 2) MINIMUM JOB-SITE PROTOCOL FOR SPECIAL INSPECTION:
- NOTIFY THE SPECIAL INSPECTOR. ADEQUATE NOTICE SHALL BE
 PROVIDED SO THAT THE SPECIAL INSPECTOR HAS TIME TO BECOME
- FAMILIAR WITH THE PROJECT.PROVIDE ACCESS TO APPROVED PLANS. THE CONTRACTOR SHALL BE
- RESPONSIBLE FOR PROVIDING THE SPECIAL INSPECTOR WITH ACCESS TO APPROVED PLANS.
- RETAIN SPECIAL INSPECTION RECORDS.
- JOB SITE, ALL SPECIAL INSPECTION RECORDS SUBMITTED BY THE INSPECTOR AND PROVIDING THESE RECORDS FOR REVIEW BY THE

THE CONTRACTOR SHALL BE RESPONSIBLE FOR RETAINING, AT THE

BUILDING DEPARTMENT'S INSPECTOR UPON REQUEST.

POST-INSTALLED STRUCTURAL ANCHORS IN CONCRETE NOTE C ACL C

NICET II (GEOTECHNICAL OR CONSTRUCTION, OR CONSTRUCTION MATERIAL TESTING OR PIER AND PILE FOUNDATIONS NOTE c NOTE d SOILS) ICC REINFORCED CONCRETE SI OR ACI CONCRETE CONSTRUCTION SI CC SOILS SI OR NICET II (GEOTECHNICAL OR SOILS CONSTRUCTION, OR CONSTRUCTION NOTE c NOTE d MATERIAL TESTING OR SOILS) ICC STRUCTURAL STEEL AND BOLTING SI STEEL (HIGH-STRENGTH BOLTING) NOTE c 5 YEARS MINIMUM OR IN AWS CWI OR STEEL (WELDING) ACCORDANCE WITH AWS ICC STRUCTURAL WELDING SI

MINIMUM QUALIFICATIONS FOR STRUCTURAL SPECIAL INSPECTORS^{a,b}

REQUIRED CERTIFICATION(S)

ICC PRESTRESSED SI AND

ICC REINFORCED CONCRETE SI

ICC REINFORCED CONCRETE SI OR

ACI CONCRETE CONSTRUCTION SI

ANSI/ASNT-CP-189 NDT OR

SNT-TC-1a NDT

ICC STRUCTURAL MASONRY SI

RDP, PE, BS ENGINEERING / ARCHITECTURE

NOTES

REQUIRED EXPERIENCE

NOTE c

NOTE c

120 HOURS FOR LEVEL II

WOOD CONSTRUCTION

NOTE C

ICC COMMERCIAL BUILDING INSPECTOR OR ICC RESIDENTIAL BUILDING INSPECTOR

NOTE d

STRUCTURAL COLD-FORMED STEEL

NOTE C

ICC COMMERCIAL BUILDING INSPECTOR OR ICC RESIDENTIAL BUILDING INSPECTOR OR ICC RESIDENTIAL BUILDING INSPECTOR

NOTE c

EXCAVATION - SHEETING, CHORING AND BRACING

NOTE c

NICET II (GEOTECHNICAL OR CONSTRUCTION, OR CONSTRUCTION, OR CONSTRUCTION MATERIAL TESTING OR SOILS)

STRUCTURAL SAFETY - STABILITY AND MECHANICAL DEMOLITION

NOTE c

NOTE c

NOTE c

NOTE c

NOTE c

NOTE c

RDP, PE, BS ENGINEERING / ARCHITECTURE OR VALID SITE SAFETY MANAGER
CERTIFICATION

NOTE c

a. IT IS RECOGNIZED THAT THE DEVELOPMENT OF QUALIFIED INSPECTORS REQUIRES THOSE INDIVIDUALS TO OBTAIN EXPERIENCE PERFORMING INSPECTIONS OF ACTUAL WORK. THE REQUIREMENTS HEREIN INCLUDE SUCH EXPERIENCE, AS DO SOME OF THE REQUIRED CERTIFICATIONS. TO PROVIDE A VEHICLE FOR INDIVIDUALS TO OBTAIN THIS EXPERIENCE, THEY SHALL PERFORM INSPECTIONS IN ACCORDANCE WITH WRITTEN ASSOCIATE OR APPRENTICE PROGRAMS THAT ARE PREPARED BY THE SIA, APPROVED BY THE SIA AND MEET THE REQUIREMENTS OF THE

LOCAL GOVERNING AUTHORITY. THESE PROGRAMS MUST INCLUDE, AT A MINIMUM, PASSING CERTIFICATION EXAMS, WHEN AVAILABLE, ADMINISTERED BY THIRD-PARTY AGENCIES, SUCH AS ICC AND ACI; IN-HOUSE SIA AND THIRD-PARTY TRAINING; OBSERVATION BY THE ASSOCIATE OR APPRENTICE OF INSPECTIONS PERFORMED BY CERTIFIED INSPECTORS; AND PERFORMANCE BY THE ASSOCIATE OR APPRENTICE INSPECTIORS OF DUPLICATE INSPECTIONS WITH CERTIFIED INSPECTORS. THIS WRITTEN PROGRAM WILL ALSO DEFINE THE USE OF ASSOCIATE OR APPRENTICE INSPECTORS AND WILL LIMIT THEIR USE BASED UPON THE LEVEL OF SUPERVISION AND THE COMPLEXITY OF THE INSPECTION ASSIGNMENT. THE COMPLEXITY OF AN ASSIGNMENT SHALL BE

MINIMAL AND/OR TASK SPECIFIC. SUPERVISION SHALL BE DIRECT, WITH A CERTIFIED INSPECTOR BEING PRESENT AT THE SITE WITH THE ASSOCIATE OR APPRENTICE. THE ASSOCIATE OR APPRENTICE INSPECTOR MUST BE APPRENTICE TO CERTIFIED INSPECTOR. THE WRITTEN PROGRAM MUST INCLUDE DOCUMENTATION OF COMPLIANCE WITH THE PROGRAM.

b. WHEN QUALIFICATIONS FOR SPECIAL INSPECTORS ARE LOCALLY DEFINED, BY STATUTE, ORDIANCE OR RULE THAT MEET OR EXCEED THE REQUIREMENTS OUTLINED IN THIS CRITERIA, THESE LOCAL REQUIREMENTS SHALL BE RECOGNIZED.

APPLICANTS SHALL COMPLY WITH ONE OF THE FOLLOWING EDUCATION AND EXPERIENCE REQUIREMENTS:
 PE, LICENSED ARCHITECTS OR BDP, AND A MINIMUM OF THREE MONTHS OF RELEVANT WORK EXPERIENCE; OR

PE, LICENSED ARCHITECTS OR BDP, AND A MINIMUM OF THREE MONTHS OF RELEVANT WORK EXPERIENCE; OR
 BS IN ENGINEERING, ARCHITECTURE OR PHYSICAL SCIENCE, AND A MINIMUM OF SIX MONTHS OF RELEVANT WORK EXPERIENCE; OR

3. TWO YEARS OF VERIFIED COLLEGE OR TECHNICAL SCHOOL (A COPY OF DIPLOMA OR TRANSCRIPT REQUIRED), AND A MINIMUM OF ONE YEAR OF RELEVANT WORK EXPERIENCE; OR
4. HIGH SCHOOL OR EQUIVALENT GRADUATE (A COPY OF DIPLOMA OR CERTIFICATE REQUIRED), AND A MINIMUM OF TWO YEARS OF VERIFIED RELEVANT WORK EXPERIENCE; OR

HIGH SCHOOL OR EQUIVALENT GRADUATE (A COPY OF DIPLOMA OR CERTIF
 A MINIMUM OF THREE YEARS OF VERIFIED RELAVANT WORK EXPERIENCE.

SPECIAL INSPECTION CATEGORY

CONCRETE CONSTRUCTION (PRESTRESSED/PRECAST)

REINFORCED CONCRETE

MASONRY CONSTRUCTION

SEISMIC ISOLATION SYSTEMS

5. A MINIMUM OF THREE YEARS OF VERIFIED RELAVANT WORK EXPERIENCE.
d. PE, LICENSED ARCHITECTS OR DRP ARE EXEMP FROM THE REQUIRED CERTIFICATIONS LISTED ON THIS TABLE, BUT ARE SUBJECT TO ON-SITE ASSESSMENT OF COMPETENCE BY IAS.

CONSULTANTS:



ARCHITECT/ENGINEERS:

 1
 2

 3
 9

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Allen & Hoshall 1661 International Drive Memphis, TN 38120 901 820 0820 fax 901 683 1001

Drawing Title	Project Title		Project Number
STATEMENT OF SPECIAL	MEMPHIS COMBIN	IED HEAT AND	614-16-114
INSPECTIONS	POWER PLANT DE	SIGN	Building Number
Approved: Project Director	Location		Drawing Number
	VAMC MEMPHIS	TN	11SS0.2
	Date	cked Drawn	11000.2
VAPAHCS PLANNING AND ENGINEERING	MARCH 10, 2016	PM JTS	Dwg. 12 of 39

Office of
Construction
and Facilities
Management

Department of
Veterans Affairs

IBC 2012 - TABLE 1705.2.2 REQUIRED VERIFICATION AND INSPECTION OF STEEL CONSTRUCTION OTHER THAN STRUCTURAL STEEL

VERIFICATION AND INSPECTION	APPLICABLE TO THIS PROJECT	CONTINUOUS	PERIODIC	REFERENCED STANDARD ^a
1. MATERIAL VERIFICATION OF COLD FORMED STEEL DECK:				
a. IDENTIFICATION MARKINGS CONFORMING TO ASTM STANDARDS SPECIFIED IN THE APPROVED CONSTRUCTION DOCUMENTS.	Y	-	Х	APPLICABLE ASTM MATERIAL STANDARDS
b. MANUFACTURER'S CERTIFIED TEST REPORTS.	Y	-	Х	
2. INSPECTION OF WELDING:				
a. COLD-FORMED STEEL DECK:				
1) FLOOR AND ROOF DECK WELDS.	N	=1	Х	AWS D1.3
b. REINFORCING STEEL:				
 VERIFICATION OF WELDABILITY OF REINFORCING STEEL OTHER THAN ASTM A 706. 	Υ	-	Х	
2) REINFORCING STEEL RESISTING FLEXURAL AND AXIAL FORCES IN INTERMEDIATE AND SPECIAL MOMENT FRAMES, AND BOUNDARY ELEMENTS OF SPECIAL STRUCTURAL WALLS OF CONCRETE AND SHEAR REINFORCEMET.	Y	Х	ь	AWS D1.4 ACI 318: SECTION 3.5.2
3) SHEAR REINFORCEMENT.	Y	Х	-]
4) OTHER REINFORCING STEEL.	Y	-]

a. WHERE APPLICABLE, SEE ALSO SECTION 1705.11, SPECIAL INSPECTIONS FOR SEISMIC RESISTANCE.

IBC 2012 - TABLE 1705.3 REQUIRED VERIFICATION AND INSPECTION OF CONCRETE CONSTRUCTION

VERIFICATION AND INSPECTION	APPLICABLE TO THIS PROJECT	CONTINUOUS	PERIODIC	REFERENCED STANDARD ^a	IBC REFERENCE
 INSPECTION OF REINFORCING STEEL, INCLUDING PRESTRESSING TENDONS, AND PLACEMENT. 	Υ	-	Х	ACI 318: 3.5, 7.1-7.7	1910.4
2. INSPECTION OF REINFORCING STEEL WELDING IN ACCORDANCE WITH TABLE 1705.2.2, ITEM 2b.	N	Ą	-	AWS D1.4 ACI 318: 3.5.2	T
3. INSPECTION OF ANCHORS CAST IN CONCRETE WHERE ALLOWABLE LOADS HAVE BEEN INCREASED OR WHERE STRENGTH DESIGN IS USED.	Υ	-	Х	ACI 318: 8.1.3, 21.1.8	1908.5, 1909.1
4. INSPECTION OF ANCHORS POST-INSTALLED IN HARDENED CONCRETE MEMBERS ^b .	Υ	-	Х	ACI 318: 3.8.6, 8.1.3, 21.1.8	1909.1
5. VERIFY USE OF REQUIRED DESIGN MIX.	Υ	=	Х	ACI 318: CH 4, 5.2-5.4	1904.2, 1910.2, 1910.3
6. AT THE TIME FRESH CONCRETE IS SAMPLED TO FABRICATE SPECIMENS FOR STRENGTH TESTS, PERFORM SLUMP AND AIR CONTENT TESTS, AND DETERMINE THE TEMPERATURE OF THE CONCRETE.	Υ	Х	-	ASTM C 172 ASTM C 31 ACI 318: 5.6, 5.8	1910.10
7. INSPECTION OF CONCRETE AND SHOTCRETE PLACEMENT FOR PROPER APPLICATION TECHNIQUES.	Υ	Х	-	ACI 318: 5.9, 5.10	1910.6, 1910.7, 1910.8
8. INSPECTION FOR MAINTENANCE OF SPECIFIED CURING TEMPERATURE AND TECHNIQUES.	Υ	=	Х	ACI 318: 5.11-5.13	1910.9
9. INSPECTION OF PRESTRESSED CONCRETE: a. APPLICATION OF PRESTRESSING FORCES b. GROUTING OF BONDED PRESTRESSING TENDONS IN THE	Z Z	X X	-	ACI 318: 18.20 ACI 318: 18.18.4	
SEISMIC FORCE-RESISTING SYSTEM 10. ERECTION OF PRECAST CONCRETE MEMBERS.	N	-	X	ACI 318: CH 6	
11. VERIFICATION OF IN-SITU CONCRETE STRENGTH, PRIOR TO STRESSING OF TENDONDS IN POST-TENSIONED CONCRETE AND PRIOR TO REMOVAL OF SHORES AND FORMS FROM BEAMS ANS STRUCTURAL SLABS.	N	-	X	ACI 318: 6.2	-
12. INSPECT FORMWORK FOR SHAPE, LOCATION AND DIMENSIONS OF THE CONCRETE MEMBER BEING FORMED.	Υ	=	Х	ACI 318: 6.1.1	-

a. WHERE APPLICABLE, SEE ALSO SECTION 1705.11, SPECIAL INSPECTIONS FOR SEISMIC RESISTANCE.

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b. SPECIFIC REQUIREMENTS FOR SPECIAL INSPECTION SHALL BE INCLUDED IN THE RESEARCH REPORT FOR THE ANCHOR ISSUED BY AN APPROVED SOURCE IN ACCORDANCE WITH ACI 355.2 OR OTHER QUALIFICATION PROCEDURES. WHERE SPECIFIC REQUIREMENTS ARE NOT PROVIDED, SPECIAL INSPECTION REQUIREMENTS SHALL BE SPECIFIED BY THE REGISTERED DESIGN PROFESSIONAL AND SHALL BE APPROVED BY THE BUILDING OFFICIAL PRIOR TO THE COMMENCEMENT OF THE WORK.

ACI 530-11 TABLE 1.19.3 LEVEL C QUALITY ASSURANCE

VERIFICATION OF f'_m AND f'_{ACC} IN ACCORDANCE WITH SPECIFICATION ARTICLE 1.4 B PRIOR TO CONSTRUCTION AND FOR EVERY 5,000 sq. ft (465 SQ. m) DURING CONSTRUCTION VERIFICATION OF PROPORTIONS OF MATERIALS IN PREMIXED OR PREBLENDED MORTAR, PRESTRESSING GROUT, AND GROUT OTHER THAN SELF-CONSOLIDATING GROUT, AS DELIVERED TO THE PROJECT SITE VERIFICATION OF SLUMP FLOW AND VISUAL STABILITY INDEX (VSI) AS DELIVERED TO THE PROJECT SITE

IN ACCORDANCE WITH ARTICLE 1.5.B.1.b.3 FOR SELF-CONSOLIDATING GROUT

MINIMUM INSPECTION

	MINIMU	JM INSPECTION				
			FREQUI	ENCY ^(a)	REFERENCE	FOR CRITERIA
	INSPECTION TASK	APPLICABLE TO THIS PROJECT	CONTINUOUS	PERIODIC	TMS 402/ ACI 530/ ASCE 5	TMS 602/ ACI 530.1/ ASCE 6
l. \	VERIFY COMPLIANCE WITH APPROVED SUBMITTALS	Υ	-	Х	-	ART 1.5
. \	VERIFY THAT THE FOLLOWING ARE IN COMPLIANCE:				•	
â	PROPORTIONS OF SITE-MIXED MORTAR, GROUT AND PRESTRESSING GROUT FOR BONDED TENDONS	Υ	-	Х	-	ART 2.1, 2.6 A 2.6 B, 2.6 C, 2.4 G.1.b
Ł	PRESTRESSING TENDONS AND ANCHORAGES	Υ	-	х	SEC 1.16	ART 2.4, 3.4
C	. PLACEMENT OF MASONRY UNITS AND CONSTRUCTION OF MORTAR JOINTS	Υ	-	Х	-	ART 3.3 B
C	I. PLACEMENT OF REINFORCEMENT, CONNECTORS, AND PRESTRESSING TENDONS AND ANCHORAGES	Υ	Х	-	SEC 1.16	ART 3.2 E, 3.4 3.6 A
E	e. GROUT SPACING PRIOR TO GROUTING	Υ	х	-	-	ART 3.2 D, 3.2 F
f	PLACEMENT OF GROUT AND PRESTRESSING GROUT FOR BONDED TENDONS	Υ	х	-	-	ART 3.5, 3.6
Ę	s. SIZE AND LOCATION OF STRUCTURAL ELEMENTS	Υ	-	Х	-	ART 3.3 F
ŀ	1. TYPE, SIZE, AND LOCATION OF ANCHORS INCLUDING OTHER DETAILS OF ANCHORAGE OF MASONRY TO STRUCTURAL MEMBERS, FRAMES, OR OTHER CONSTRUCTION	Υ	Х	-		-
i	. WELDING OF REINFORCEMENT	Υ	Х	-		-
j	PREPARATION, CONSTRUCTION, AND PROTECTION OF MASONRY DURING COLD WEATHER (TEMPERATURE BELOW 40°F (4.4°C)) OR HOT WEATHER	Υ	-	Х	-	ART 1.8 C, 1.8 D
k	. APPLICATION AND MEASUREMENT OF PRESTRESSING FORCE	Υ	Х	-	-	ART 3.6 B
Ĭ	PLACEMENT OF AAC MASONRY UNITS AND CONSTRUCTION OF THIN-BED MORTAR JOINTS	Υ	Х	-	-	ART 3.3 B.8
r	n. PROPERTIES OF THIN-BED MORTAR FOR AAC MASONRY	Υ	Х	-	-	ART 2.1 C.1
	DBSERVE PREPARATION OF GROUT SPECIMENTS, MORTAR SPECIMENS, AND/OR PRISMS	Υ	х	_	-	ART 1.4 B.2.a 1.4 B.2.b.3, 1.4 B.2.c.3, 1.4 B.3, 1.4 B

(a) FREQUENCY REFERS TO THE FREQUENCY OF INSPECTION, WHICH MAY BE CONTINUOUS DURING THE TASK LISTED OR PERIODICALLY DURING THE LISTED TASK, AS DEFINED IN THE TABLE.

AISC 360-10 - TABLE N5.6-1 INSPECTION TASKS PRIOR TO BOLTING

INSPECTION TASKS PRIOR TO BOLTING	APPLICABLE TO THIS PROJECT	QC	QA
MANUFACTURER'S CERTIFICATIONS AVAILABLE FOR FASTENER MATERIALS	Υ	0	Р
FASTENERS MARKED IN ACCORDANCE WITH ASTM REQUIREMENTS	Υ	0	0
PROPER FASTENERS SELECTED FOR THE JOINT DETAIL (GRADE, TYPE, BOLT LENGTH IF THREADS ARE TO BE EXCLUDED FROM SHEAR PLANE)	Υ	0	0
PROPER BOLTING PROCEDURE SELECTED FOR JOINT DETAIL	Y	0	0
CONNECTING ELEMENTS, INCLUDING THE APPROPRIATE FAYING SURFACE CONDITION AND HOLE PREPARATION, IF SPECIFIED, MEET APPLICABLE REQUIREMENTS	Υ	0	0
PRE-INSTALLATION VERIFICATION TESTING BY INSTALLATION PERSONNEL OBSERVED AND DOCUMENTED FOR FASTENER ASSEMBLIES AND METHODS USED	Υ	Р	0
PROPER STORAGE PROVIDED FOR BOLTS, NUTS, WASHERS AND OTHER FASTENER COMPONENTS	Υ	0	0

O - OBSERVE THESE ITEMS ON A RANDOM BASIS.

P - PERFORM THESE TASKS FOR EACH STEEL ELEMENT. QC - PROVIDED BY FABRICATOR AND ERECTOR

QA - PROVIDED BY OWNER'S AGENT

AISC TABLE N5.6-2 INSPECTION TASKS DURING BOLTING

INSPECTION TASKS DURING BOLTING	APPLICABLE TO THIS PROJECT	QC	QA
FASTENER ASSEMBLIES, OF SUITABLE CONDITION, PLACED IN ALL HOLES AND WASHERS (IF REQUIRED) ARE POSITIONED AS REQUIRED	Y	0	0
JOINT BROUGHT TO THE SNUG-TIGHT CONDITION PRIOR TO THE PRETENSIONING OPERATION	Y	0	0
FASTENER COMPONENT NOT TURNED BY THE WRENCH PREVENTED FROM ROTATING	Y	0	0
FASTENERS ARE PRETENSIONED IN ACCORDANCE WITH THE RCSC SPECIFICATION, PROGRESSING SYSTEMATICALLY FROM THE MOST RIGID POINT TOWARD THE FREE EDGES	N	0	0

O - OBSERVE THESE ITEMS ON A RANDOM BASIS. P - PERFORM THESE TASKS FOR EACH STEEL ELEMENT.

QC - PROVIDED BY FABRICATOR AND ERECTOR

QA - PROVIDED BY OWNER'S AGENT

AISC TABLE N5.6-3 INSPECTION TASKS AFTER BOLTING

INSPECTION TASKS AFTER BOLTING	APPLICABLE TO THIS PROJECT	QC	QA
DOCUMENT ACCEPTANCE OR REJECTION OF BOLTED CONNECTIONS	Y	Р	Р

O - OBSERVE THESE ITEMS ON A RANDOM BASIS. P - PERFORM THESE TASKS FOR EACH STEEL ELEMENT.

QC - PROVIDED BY FABRICATOR AND ERECTOR QA - PROVIDED BY OWNER'S AGENT

AISC 360-10 - TABLE N5.4-1 INSPECTION TASKS PRIOR TO WELDING

INSPECTION TASKS PRIOR TO WELDING	APPLICABLE TO THIS PROJECT	QC	QA
WELDING PROCEDURE SPECIFICATIONS (WPSS) AVAILABLE	Y	Р	Р
MANUFACTURER CERTIFICATIONS FOR WELDING CONSUMABLES AVAILABLE	Y	Р	Р
MATERIAL IDENTIFICATION (TYPE/GRADE)	Y	0	0
WELDER IDENTIFICATION SYSTEM ¹	Y	0	0
FIT-UP OF GROOVE WELDS (INCLUDING JOINT GEOMETRY) • JOINT PREPARATION • DIMENSIONS (ALIGNMENT, ROOT OPENING, ROOT FACE, BEVEL) • CLEANLINESS (CONDITION OF STEEL SURFACES) • TACKING (TACK WELD QUALITY AND LOCATION) • BACKING TYPE AND FIT (IF APPLICABLE)	Y	0	0
CONFIGURATION AND FINISH OF ACCESS HOLES	Y	0	0
FIT-UP OF FILLET WELDS • DIMENSIONS (ALIGNMENT, GAPS AT ROOT)	Y	0	0
CHECK WELDING EQUIPMENT	Υ	0	_

IDENTIFIED. STAMPS, IF USED, SHALL BE THE LOW-STRESS TYPE.

O - OBSERVE THESE ITEMS ON A RANDOM BASIS. P - PERFORM THESE TASKS FOR EACH STEEL ELEMENT.

QC - PROVIDED BY FABRICATOR AND ERECTOR QA - PROVIDED BY OWNER'S AGENT

AISC TABLE N5.4-2 INSPECTION TASKS DURING WELDING

INSPECTION TASKS DURING WELDING	APPLICABLE TO THIS PROJECT	QC	QA
USE OF QUALIFIED WELDERS	Υ	0	0
CONTROL AND HANDLING OF WELDING CONSUMABLES			
• PACKAGING	Υ	0	0
EXPOSURE CONTROL			
NO WELDING OVER CRACKED TACK WELDS	Υ	0	0
ENVIRONMENTAL CONDITIONS			
WIND SPEED WITHIN LIMITS	Υ	0	0
PRECIPITATION AND TEMPERATURE			
WPS FOLLOWED			
SETTINGS ON WELDING EQUIPMENT			
TRAVEL SPEED			
SELECTED WELDING MATERIALS	Y	0	0
SHIELDING GAS TYPE/FLOW RATE	1		0
PREHEAT APPLIED			
 INTERPASS TEMPERATURE MAINTAINED (MIN./MAX.) 			
PROPER POSITION (F, V, H, OH)			
WELDING TECHNIQUES			
INTERPASS AND FINAL CLEANING	Y	0	0
EACH PASS WITHIN PROFILE LIMITATIONS	l i		
 EACH PASS MEETS QUALITY REQUIREMENTS 			

O - OBSERVE THESE ITEMS ON A RANDOM BASIS. P - PERFORM THESE TASKS FOR EACH STEEL ELEMENT. QC - PROVIDED BY FABRICATOR AND ERECTOR

QA - PROVIDED BY OWNER'S AGENT

AISC TABLE N5.4-3 INSPECTION TASKS AFTER WELDING

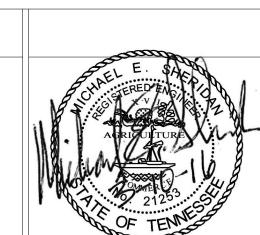
INSPECTION TASKS AFTER WELDING	APPLICABLE TO THIS PROJECT	QC	QA
WELDS CLEANED	Υ	0	0
SIZE, LENGTH AND LOCATION OF WELDS	Y	Р	Р
WELDS MEET VISUAL ACCEPTANCE CRITERIA • CRACK PROHIBITION			
WELD/BASE-METAL FUSION CRATER CROSS SECTION			
WELD PROFILES WELD SIZE	Y	Р	Р
WELD SIZE UNDERCUT POROSITY			
ARC STRIKES	Υ	Р	Р
K-AREA ¹	Y	Р	Р
BACKING REMOVED AND WELD TABS REMOVED (IF REQUIRED)	Y	Р	Р
REPAIR ACTIVITIES	Υ	Р	Р
DOCUMENT ACCEPTANCE OR REJECTION OF WELDED JOINT OR MEMBER	Υ	Р	Р
1 WHEN WELDING OF DOUBLER PLATES, CONTINUITY PLATES OR STIFFENERS HAS BEEN PERFORMED IN AREA FOR CRACKS WITHIN 3 in. (75 mm) OF THE WELD.	THE k-AREA, VISUALLY	INSPECT TH	E WEB k-

O - OBSERVE THESE ITEMS ON A RANDOM BASIS.

P - PERFORM THESE TASKS FOR EACH STEEL ELEMENT.

QC - PROVIDED BY FABRICATOR AND ERECTOR QA - PROVIDED BY OWNER'S AGENT

CONSULTANTS:



1 3 4 5

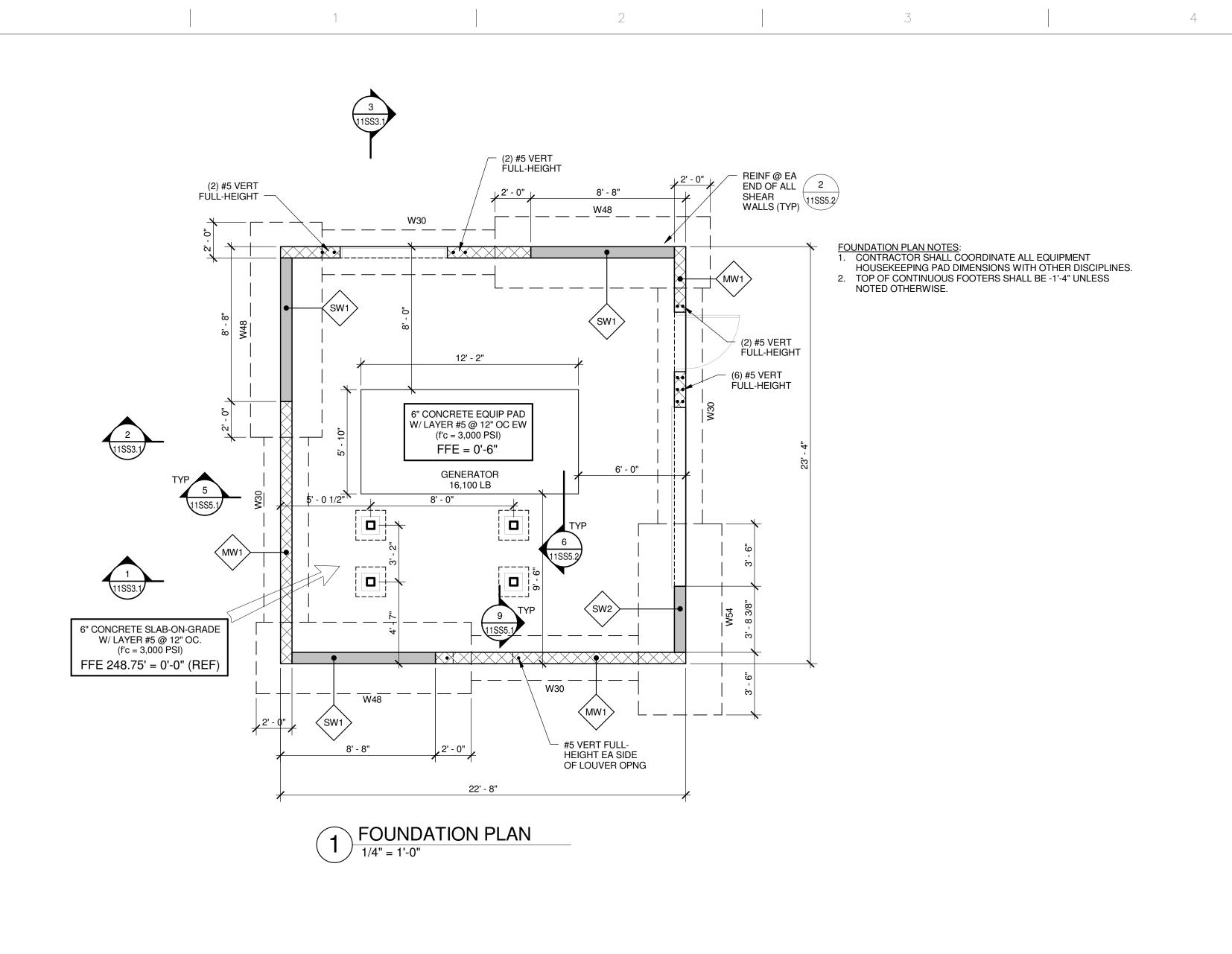
ARCHITECT/ENGINEERS:

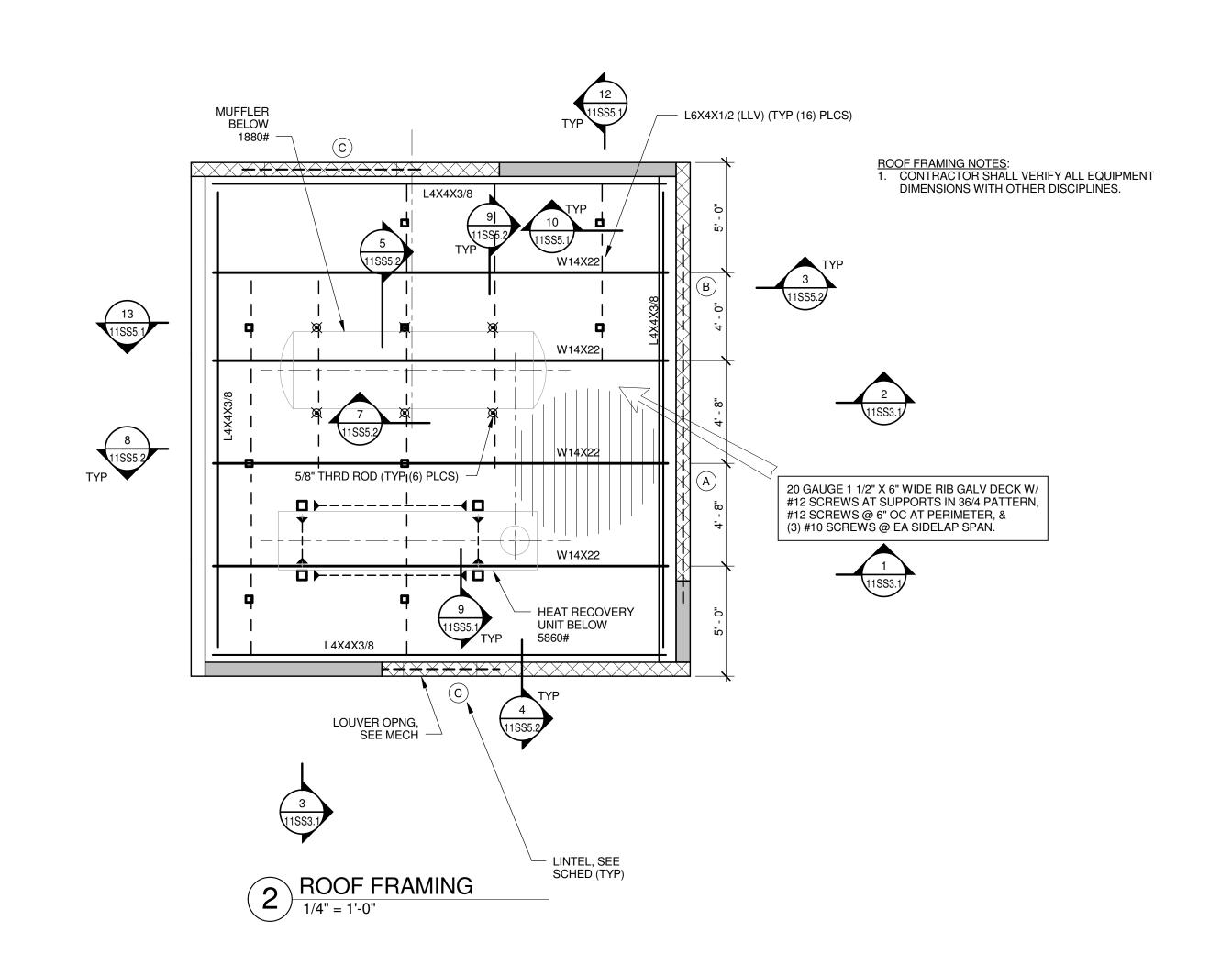
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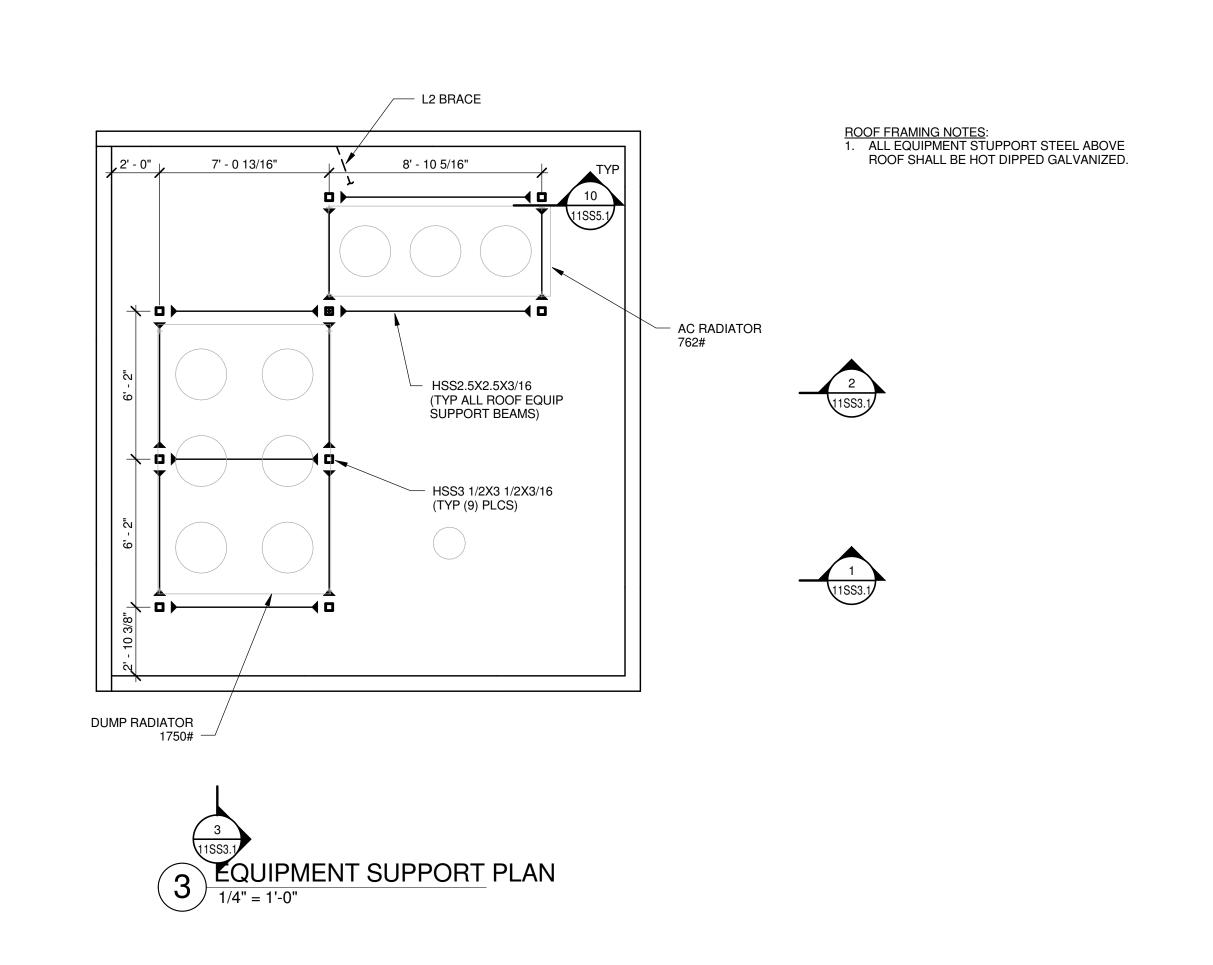
Allen & Hoshall 1661 International Drive Memphis, TN 38120 901 820 0820 fax 901 683 1001

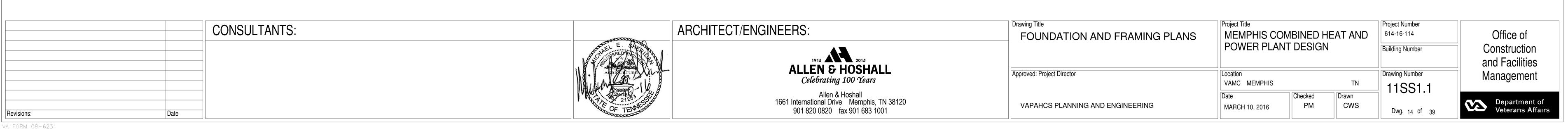
Drawing Title Project Title Project Number MEMPHIS COMBINED HEAT AND 614-16-114 STRUCTURAL SPECIAL INSPECTIONS POWER PLANT DESIGN Building Number Approved: Project Director Drawing Number VAMC MEMPHIS 11SS0.3 VAPAHCS PLANNING AND ENGINEERING CWS PM MARCH 10, 2016 Dwg. 13 of 39

Office of Construction and Facilities Management Department of Veterans Affairs

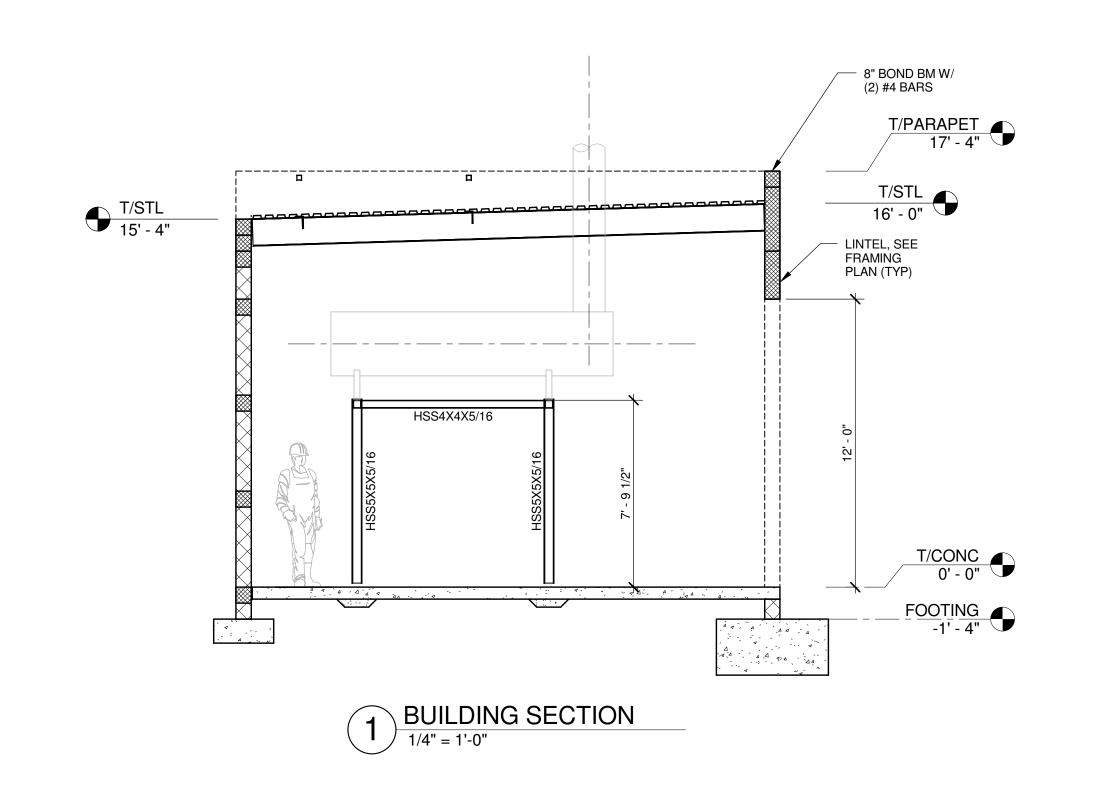


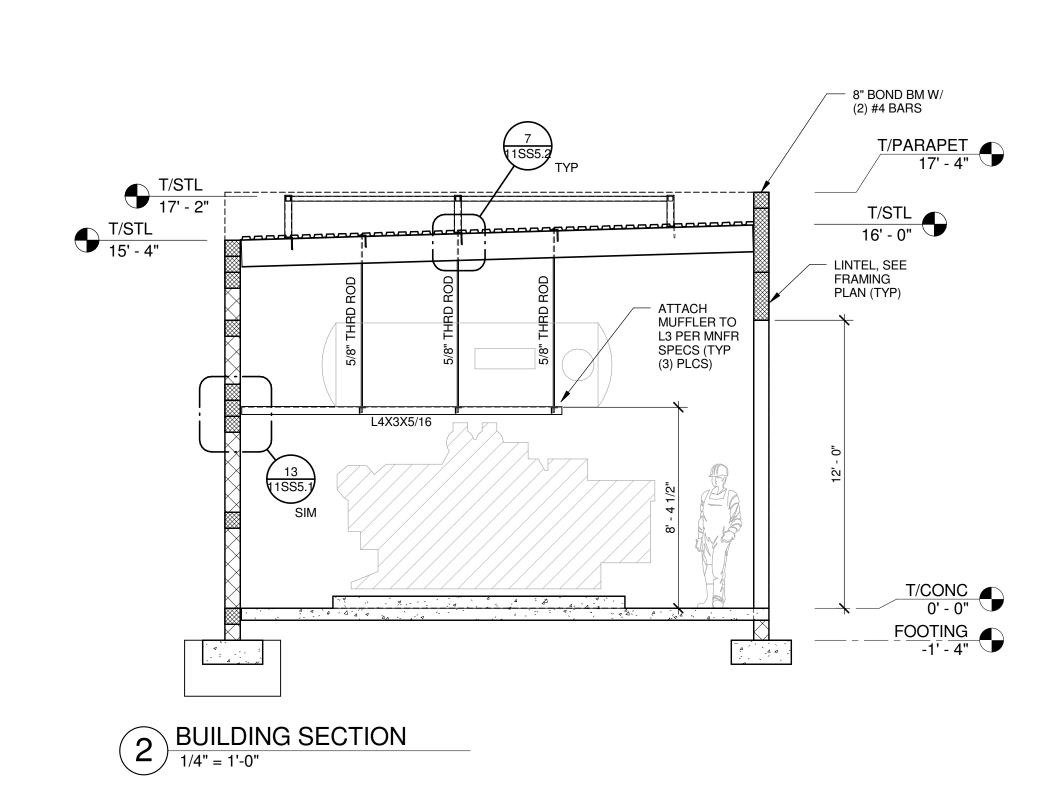


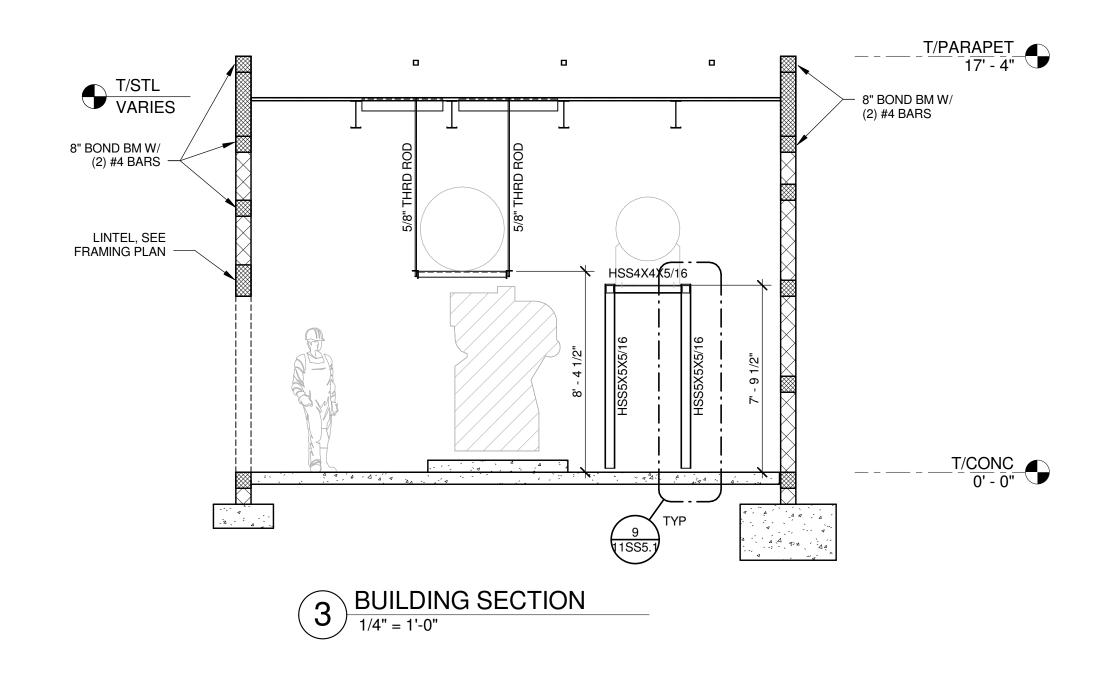




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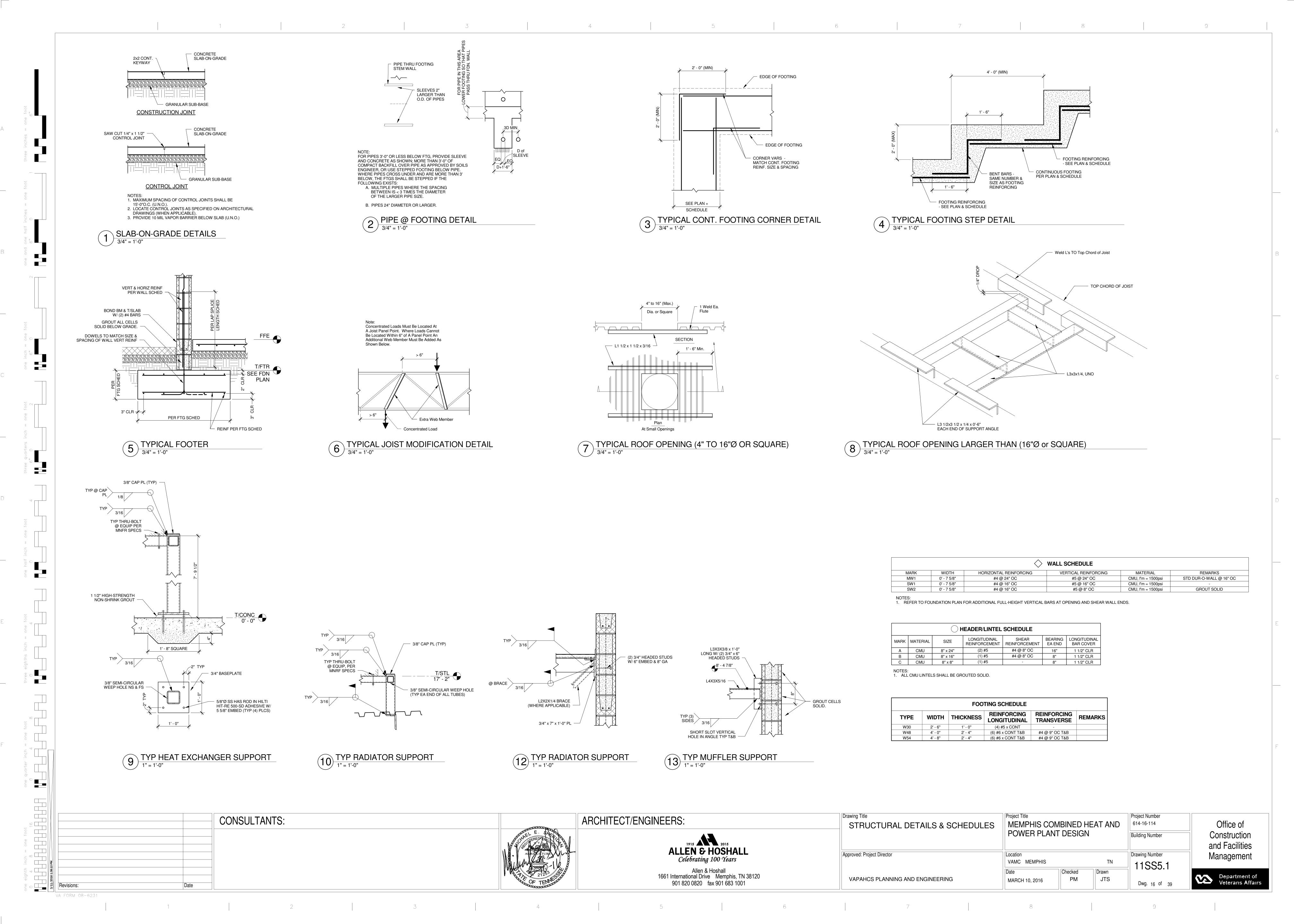


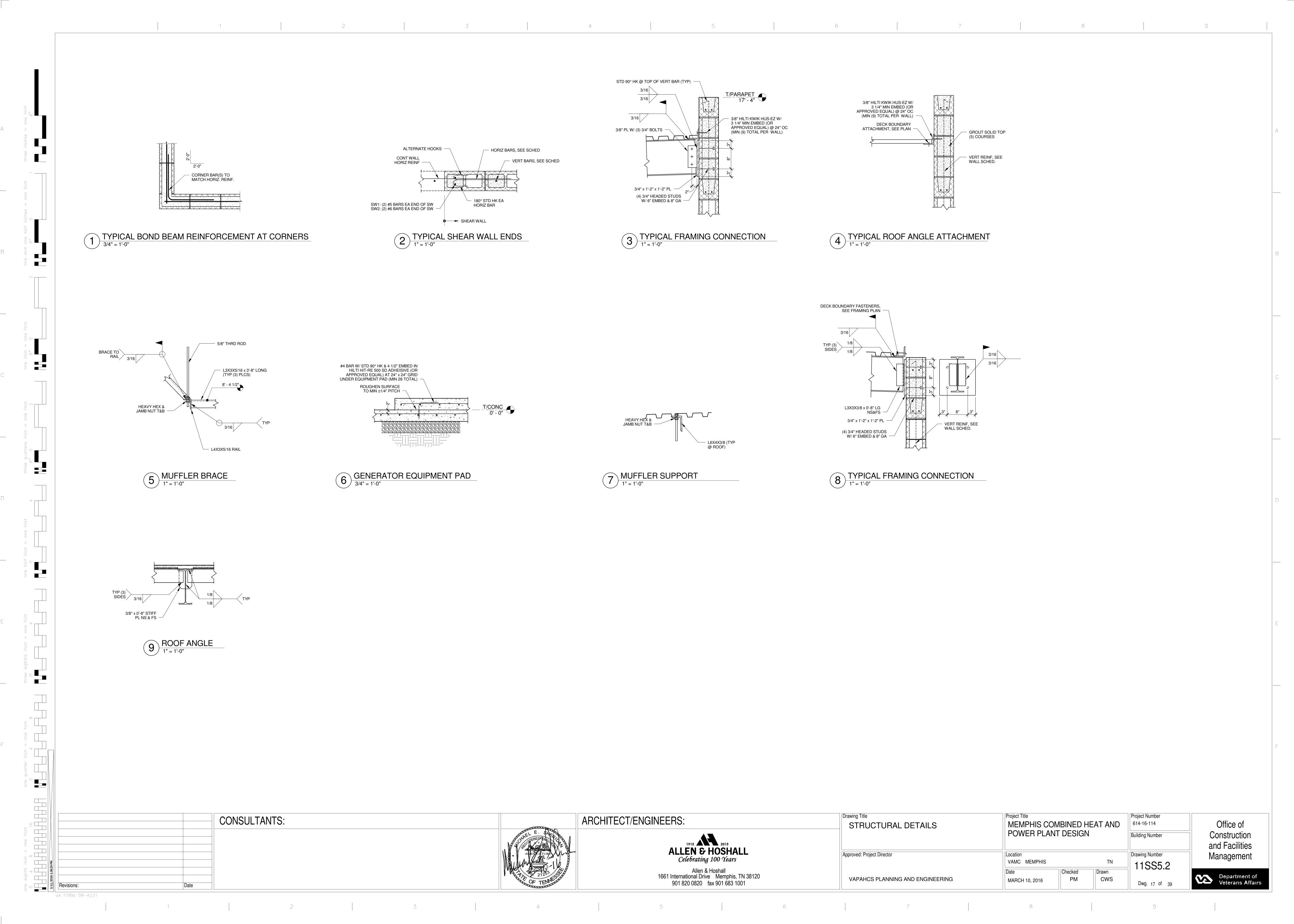


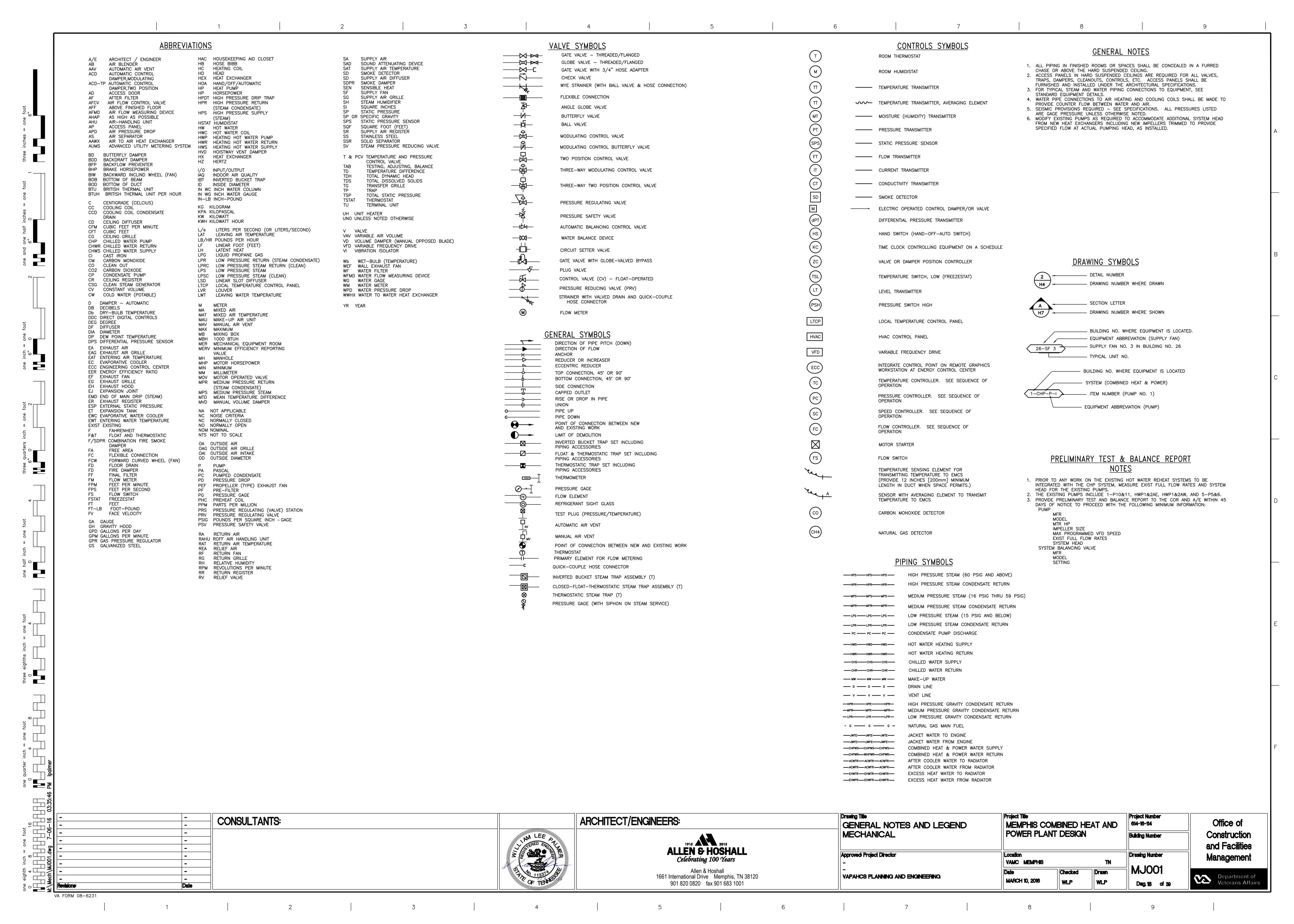


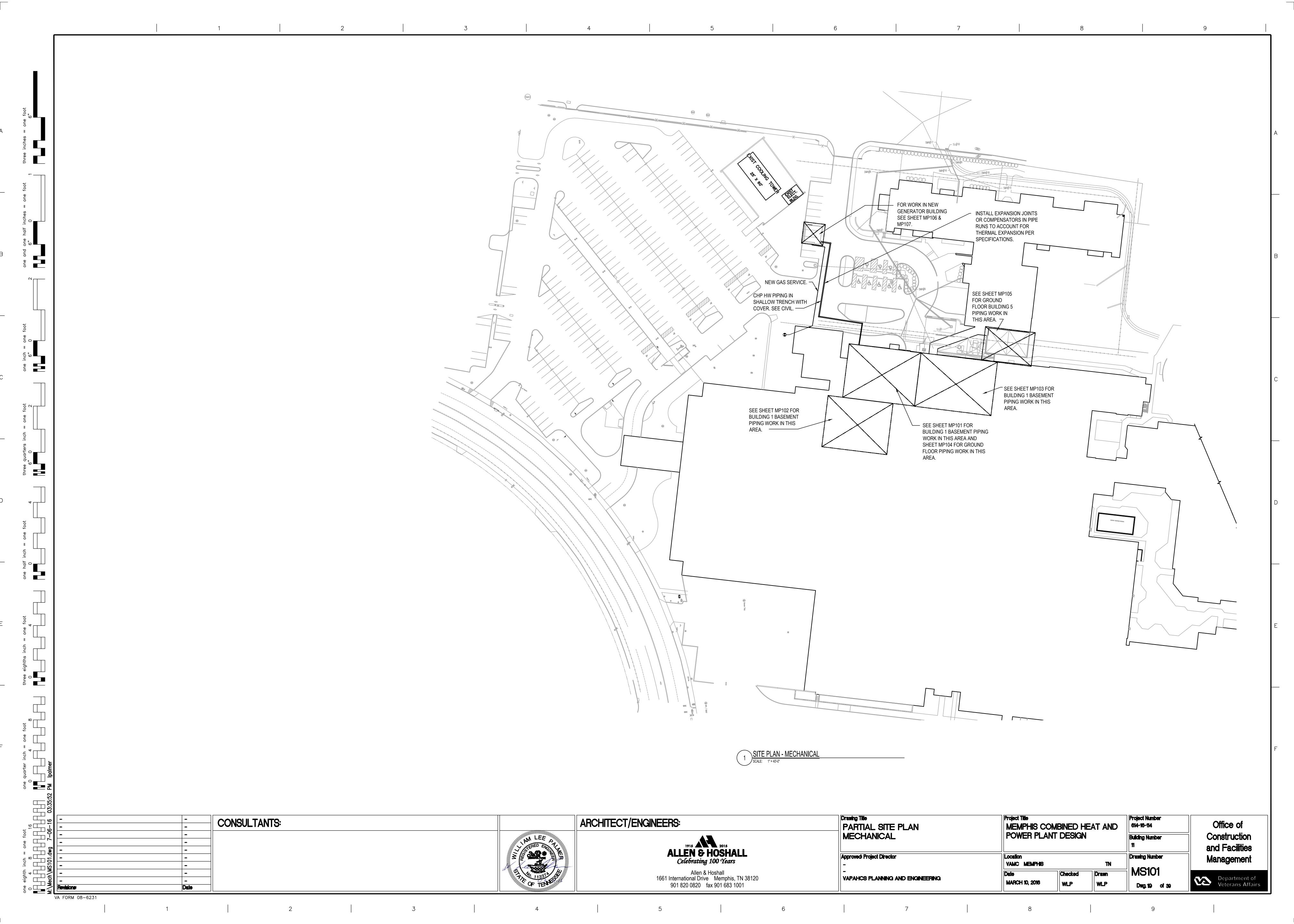


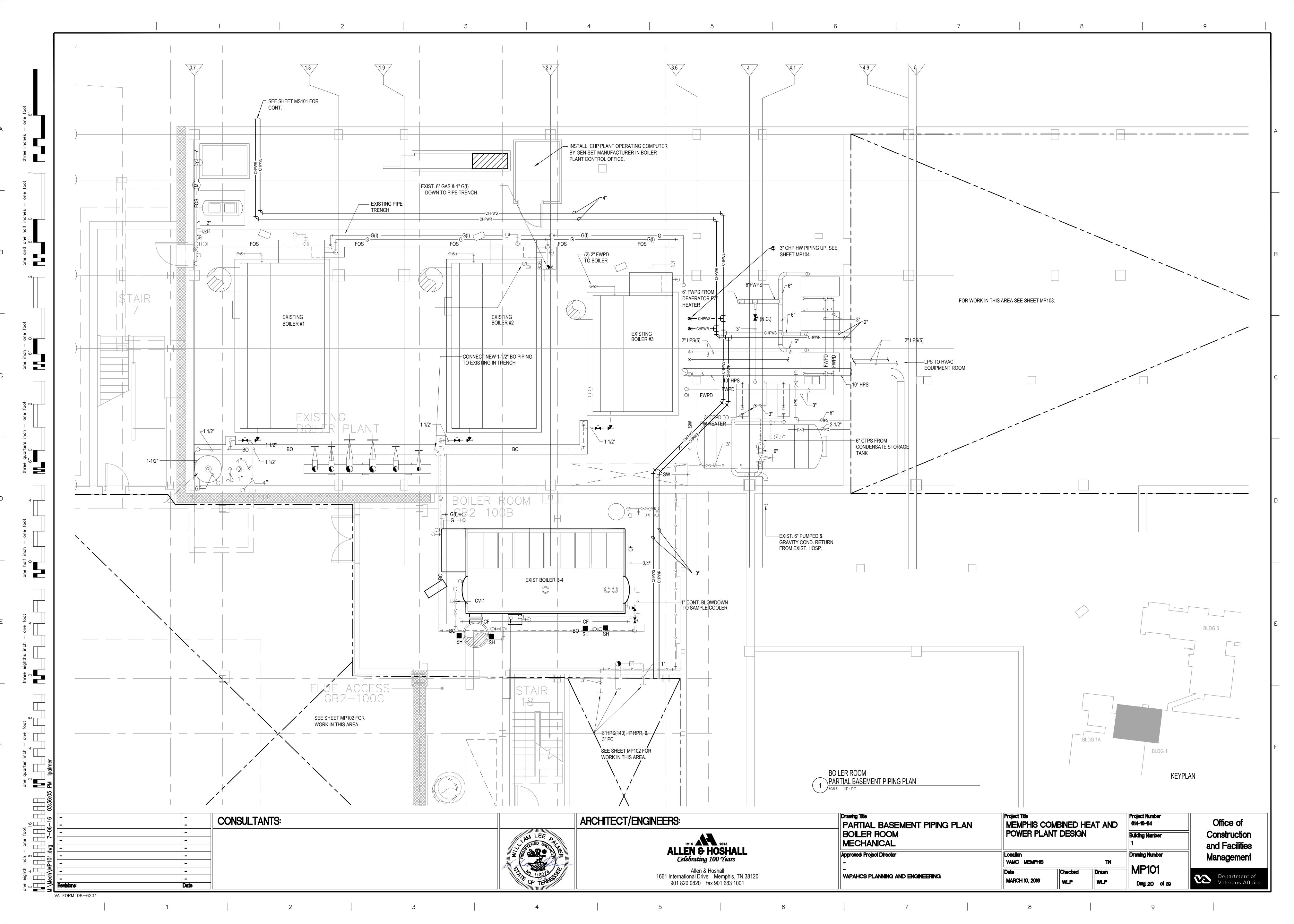
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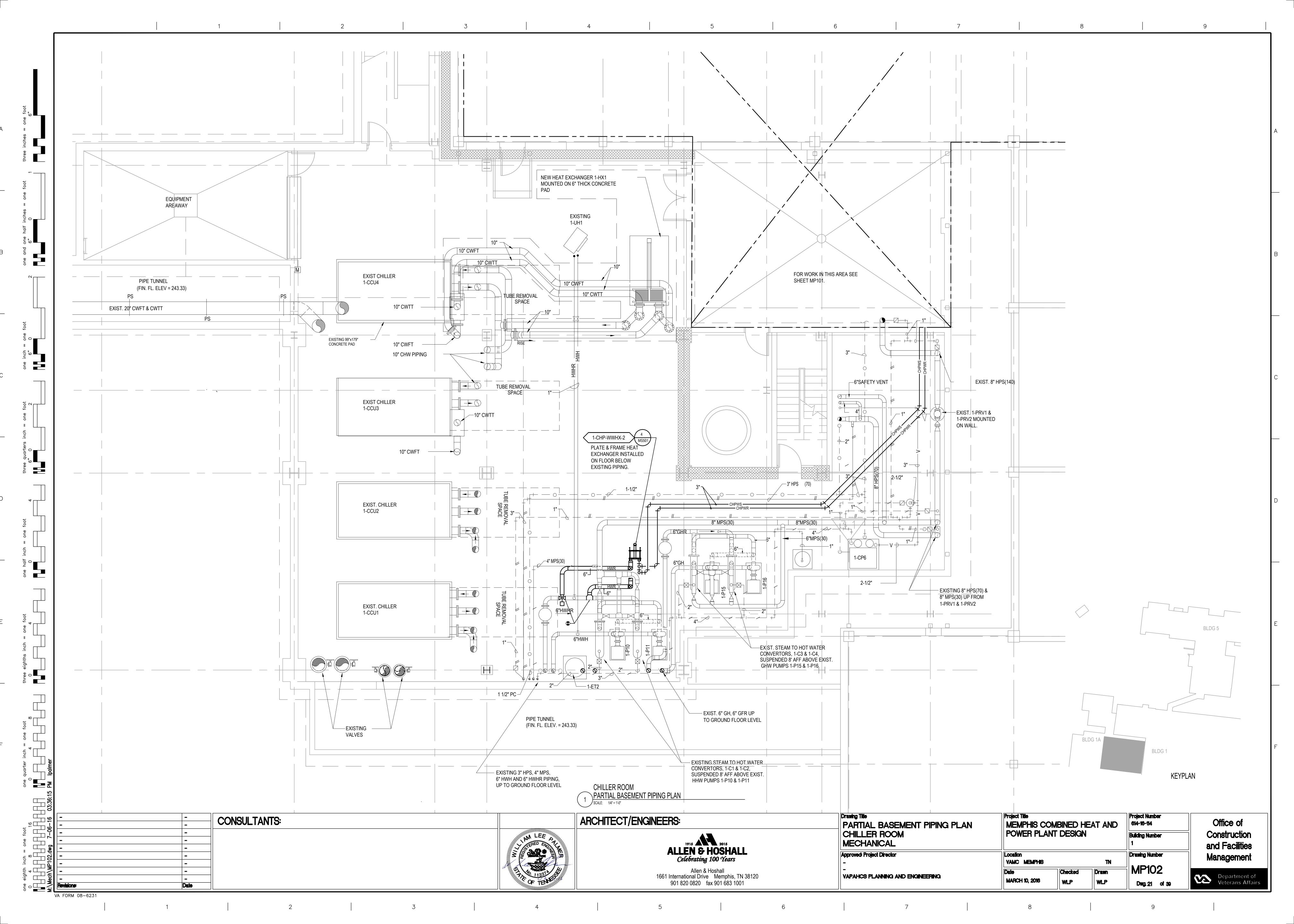


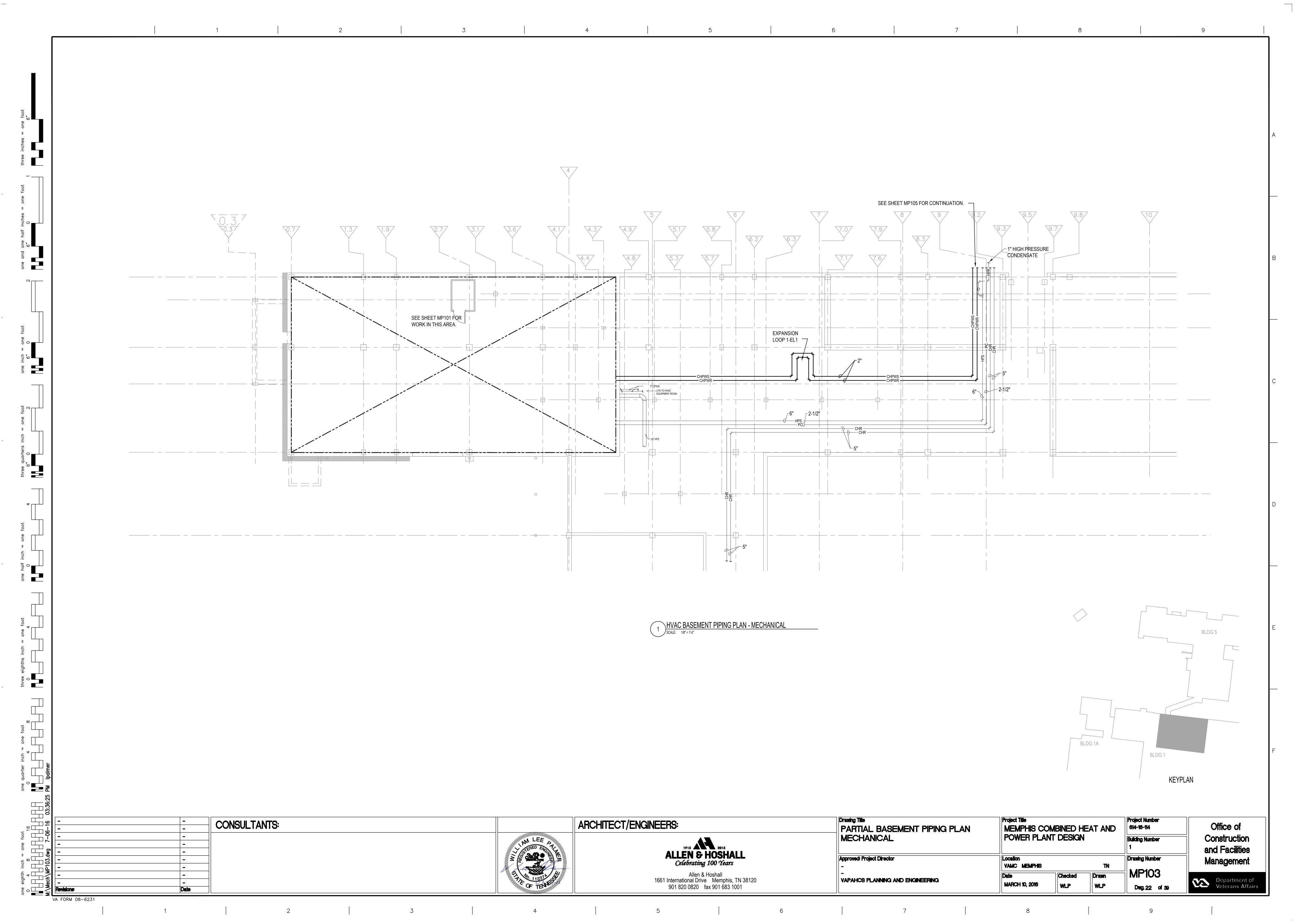


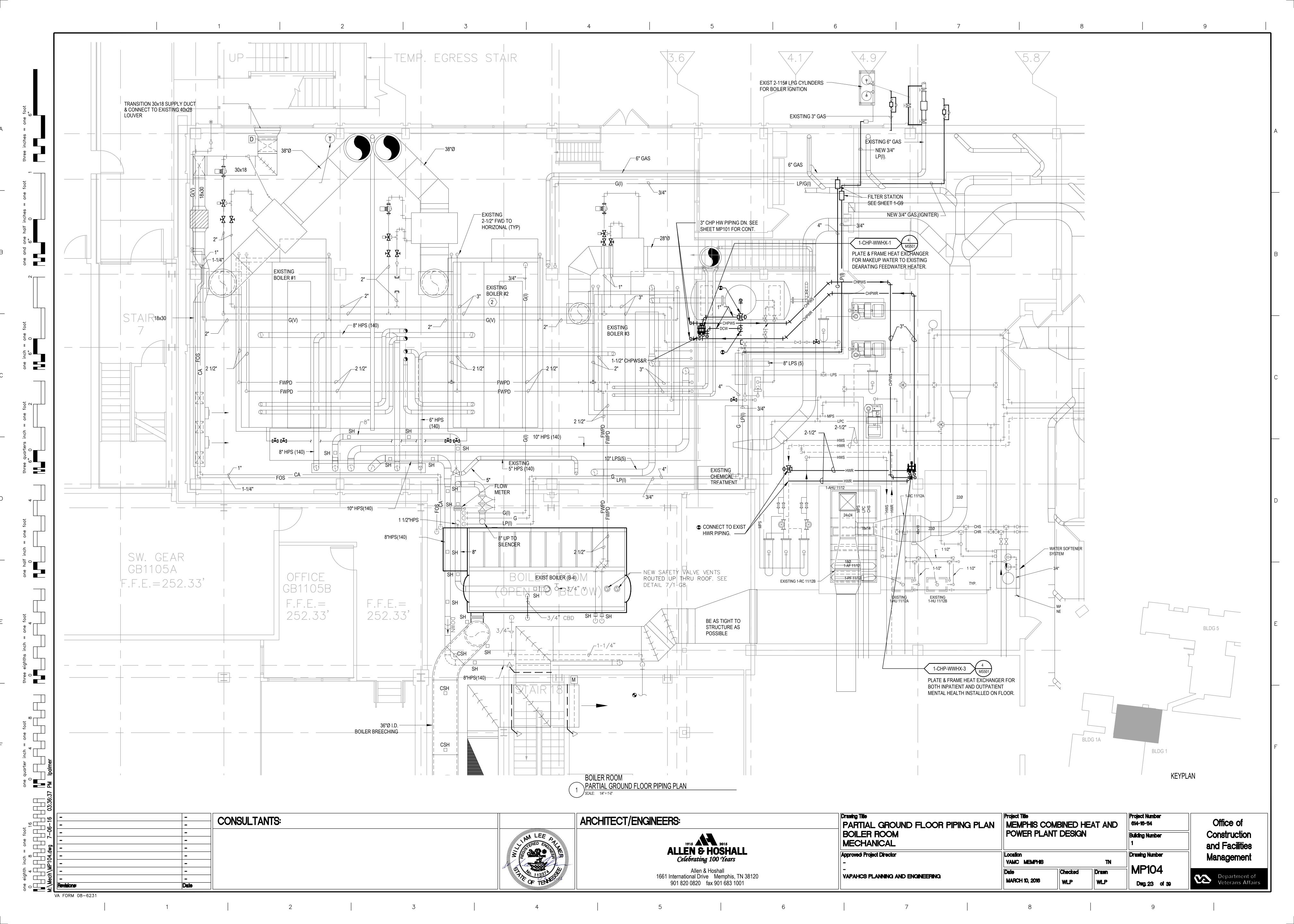


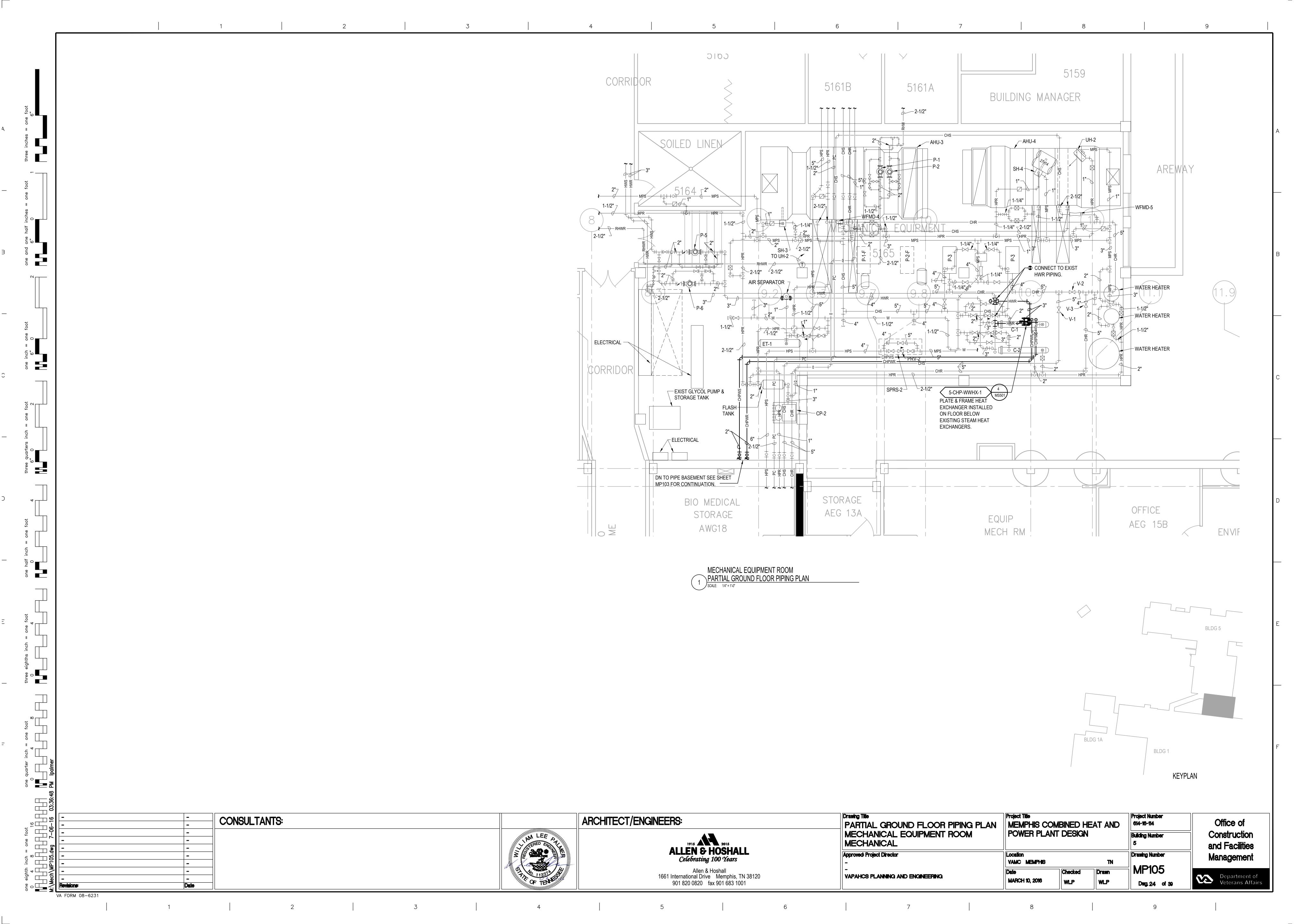


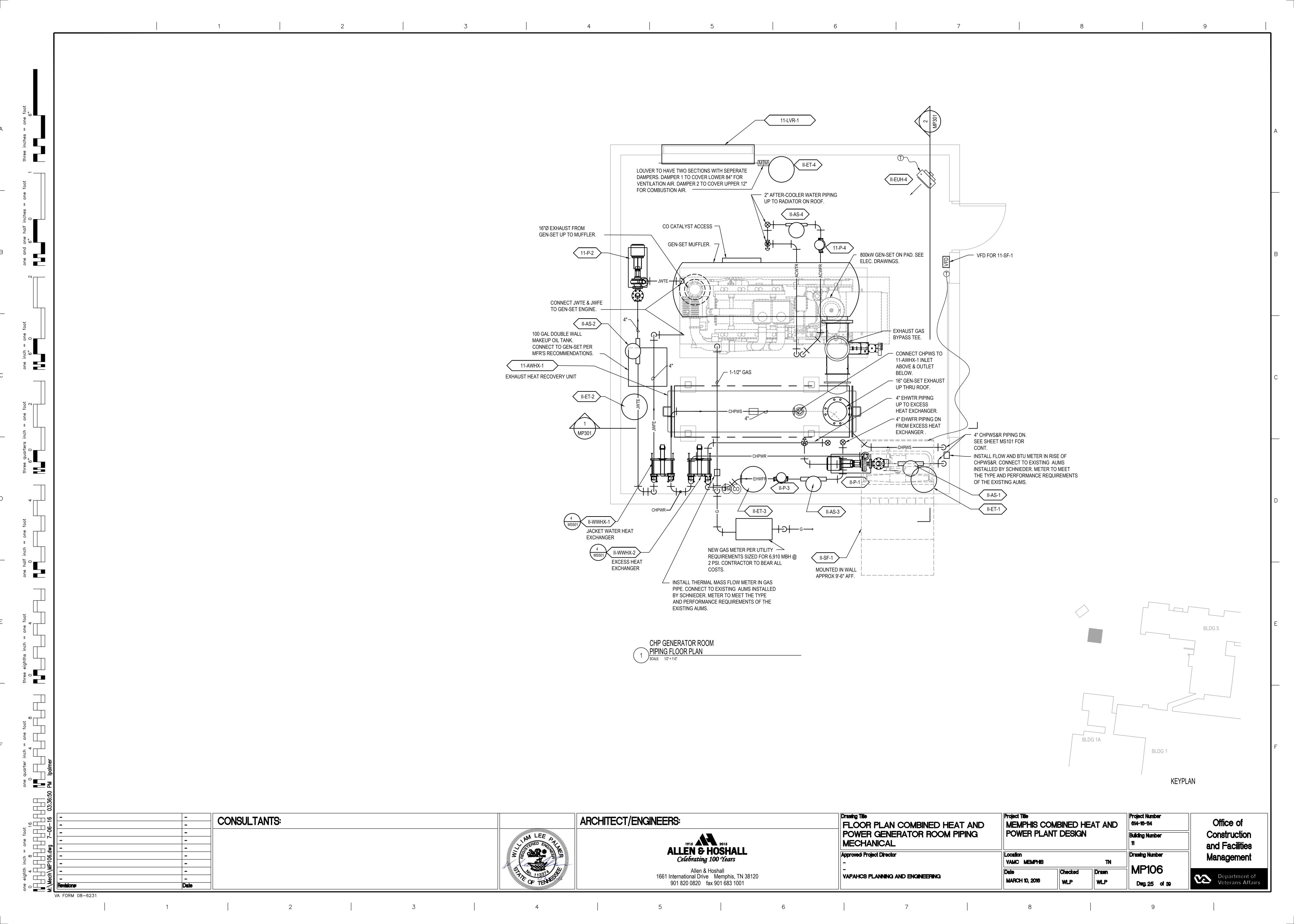


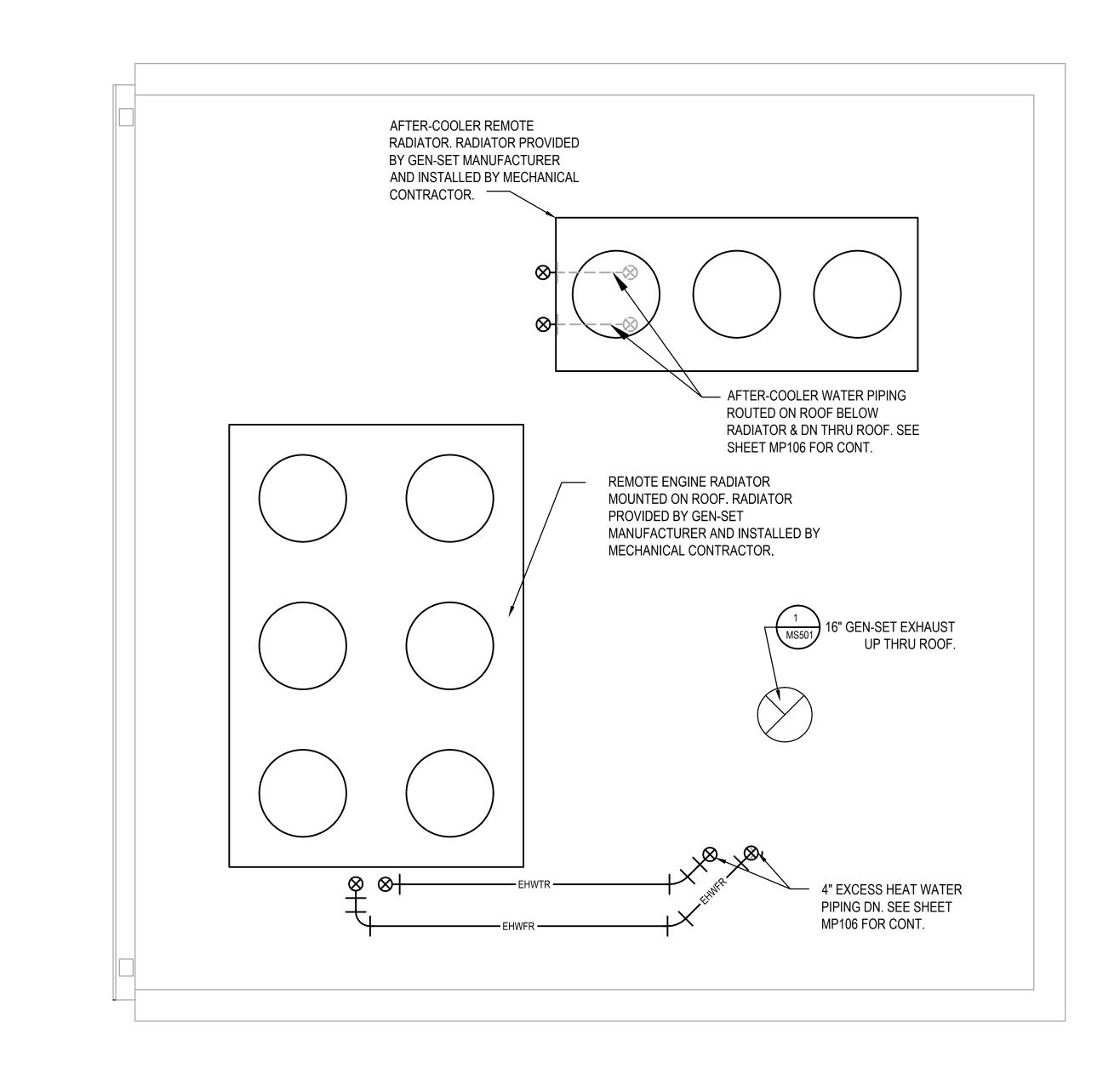


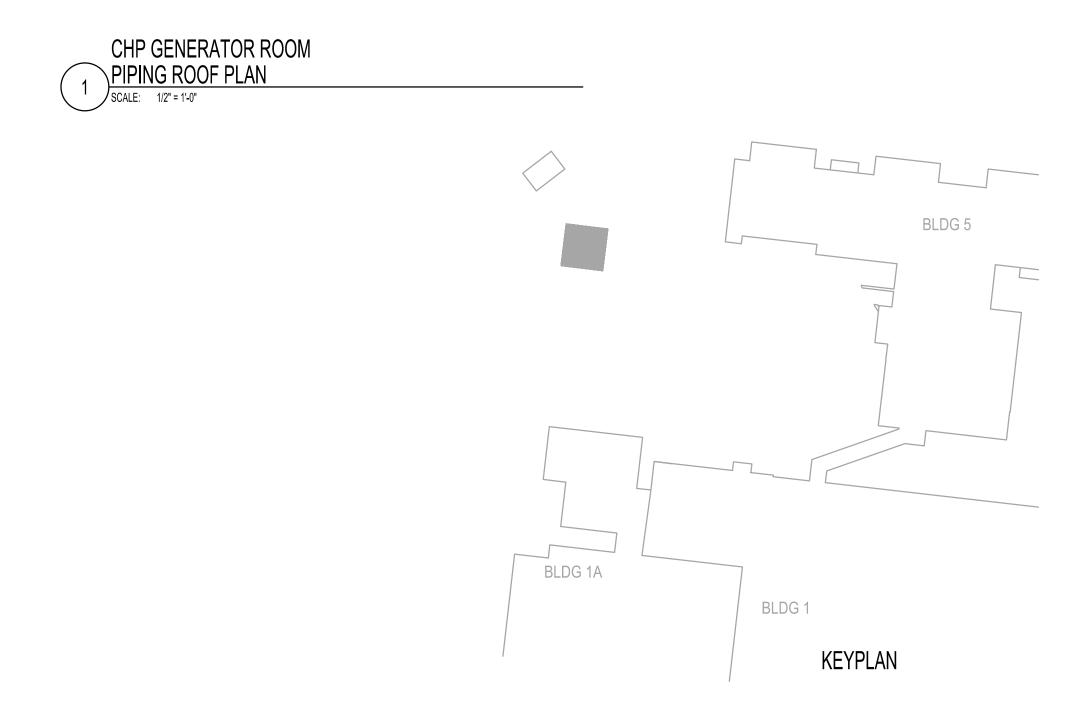




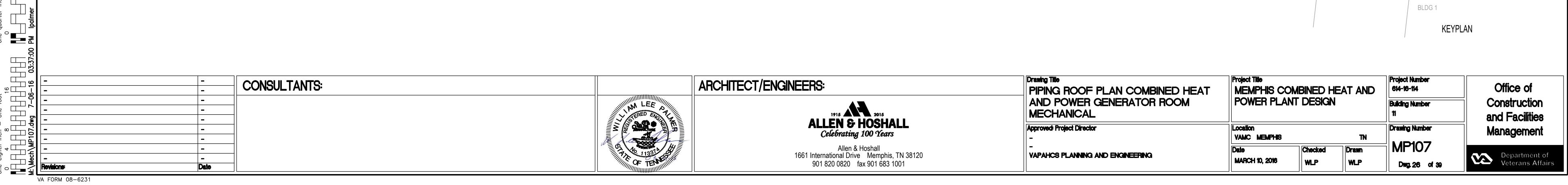






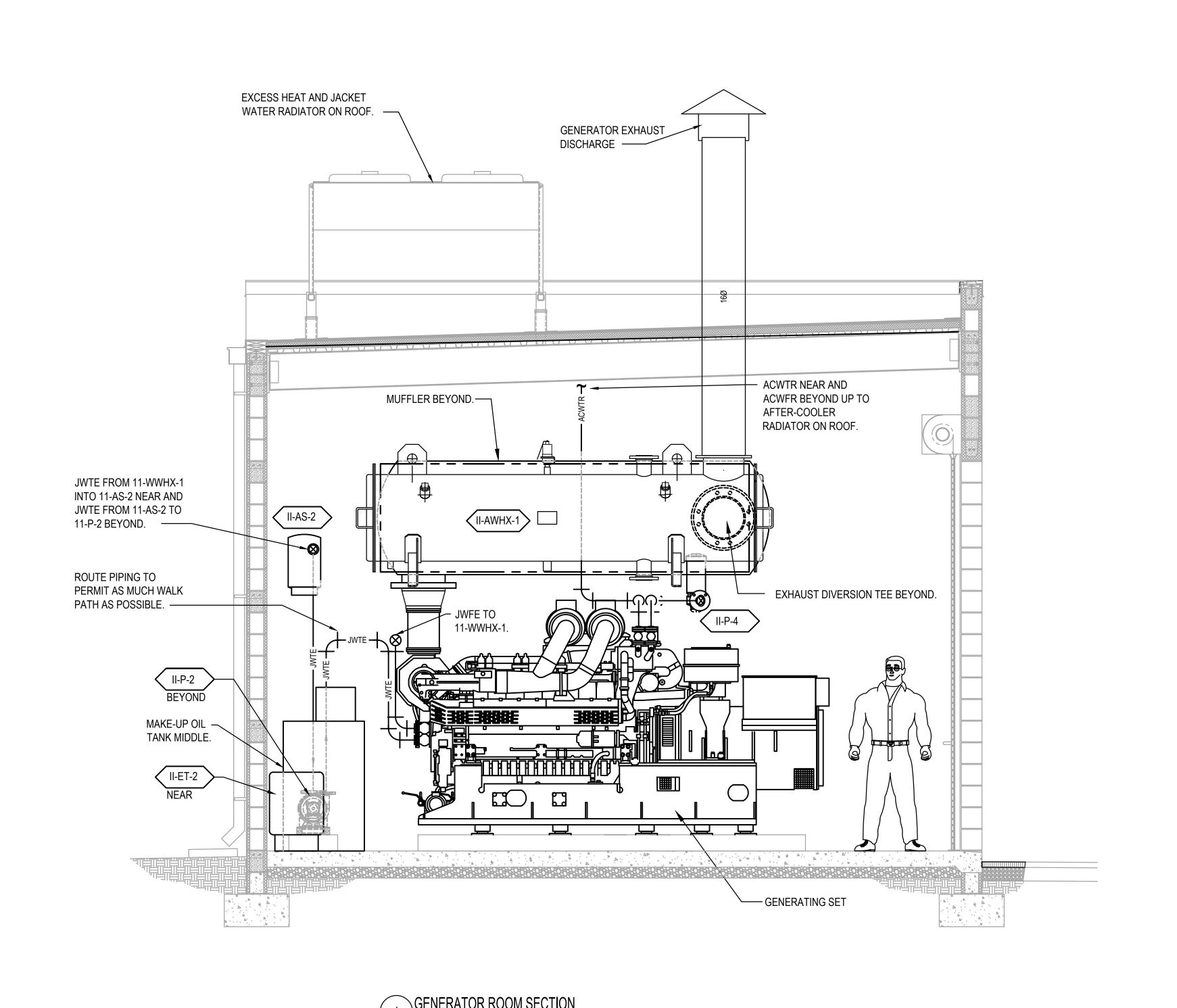


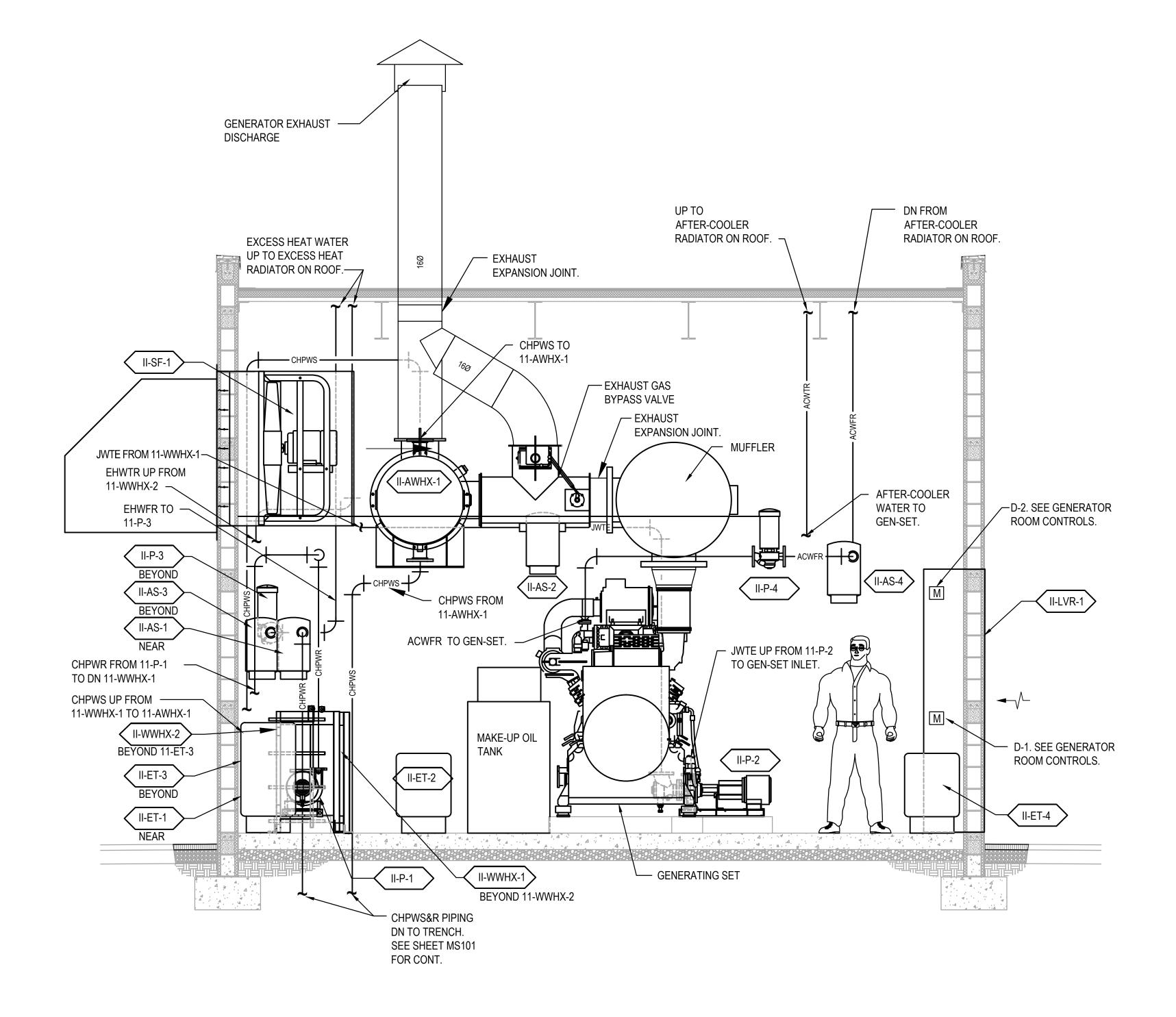
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GENERATOR ROOM SECTION

6 7

CONSULTANTS:

2 3 4 5

PM Ipal

VA FORM 08-6231

ARCHITECT/ENGINEERS:

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Project Title

MEMPHIS COMBINED HEAT AND **Project Number** 614-16-114 **Drawing Title** SECTIONS COMBINED HEAT AND POWER GENERATOR ROOM POWER PLANT DESIGN **Building Number** MECHANICAL Approved: Project Director Location **Drawing Number** VAMC MEMPHIS MP301 VAPAHCS PLANNING AND ENGINEERING MARCH 10, 2016 Dwg. 27 of 39

Office of
Construction
and Facilities
Management

Department of
Veterans Affairs

1. GENERAL

- a. CHP PLANT CONTROL SYSTEM, DEVICES, AND SEQUENCES BY GEN—SET MANUFACTURER. CONTRACTOR SHALL EXTEND CONTROLS TO ALL ITEMS SUPPLIED WITH GEN—SET (IE. HEAT EXCHANGERS & CONTROL VALVES, RADIATORS PUMPS, ETC.) AND PLANT EQUIPMENT NOT SUPPLIED WITH BY THE GEN—SET MANUFACTURER.
- b. THE SEQUENCES PROVIDED HERE ARE FOR GENERAL CHP PLANT OPERATIONS TO PROVIDE HOT WATER FOR USE BY THE FACILITY IN THE LOAD HEAT EXCHANGERS AND ARE NOT EXHAUSTIVE OF THE CONTROLS AND SAFETIES NECESSARY FOR COMPLETE CONTROL OF THE GEN-SET. GEN-SET MANUFACTURER TO PROVIDE ALL OTHER NECESSARY CONTROL DEVICES, SEQUENCES, AND SAFETIES FOR PROPER OPERATION OF THE GEN-SET AND FOR FULL WARRANTY TO BE APPLICABLE.
- c. GEN-SET PLANT CONTROL SYSTEM TO PROVIDE CHP WATER PUMP STATUS OUTPUT TO BUILDING ENERGY MANAGEMENT SYSTEM FOR USE IN CONTROL OF LOAD HEAT EXCHANGERS AND GENERATOR STATUS OUTPUT FOR USE IN GENERATOR ROOM VENTILATION CONTROLS.
- 2. PUMP & AFTER-COOLER CONTROL
- a. THE AFTER—COOLER, JACKET WATER, CHP WATER, AND EXCESS HEAT WATER PUMPS SHALL RECEIVE START AND STOP COMMAND FROM THE GEN—SET CONTROLS.
- b. THE AFTER-COOLER AND EXCESS HEAT RADIATOR SHALL RECEIVE START AND STOP COMMAND FROM THE GEN-SET CONTROLS.
- c. THE AFTER—COOLER PUMP & RADIATOR, JACKET WATER PUMP AND RADIATOR, AND CHP WATER PUMP SHALL BE ENABLED AND ENERGIZED WHEN THE GEN—ET IS OPERATIONAL AND REMAIN OPERATIONAL FOR AN ADJUSTABLE PERIOD OF 8 MINUTES (ADJUSTABLE) POST GEN—SET SHUT DOWN TO PROTECT THE ENGINE AND EXHAUST GAS HEAT EXCHANGER FROM OVERHEATING.
- d. THE EXCESS HEAT WATER PUMP AND RADIATOR SHALL BE ENABLED WHEN THE GEN—SET IS OPERATIONAL AND ENERGIZED AS DESCRIBED IN SECTION 3 BELOW. IF THE EXCESS HEAT SYSTEM IS ENERGIZED AT THE TIME OF GENERATOR SHUTDOWN THEY SHALL REMAIN OPERATIONAL FOR THE SAME ADJUSTABLE PERIOD AS DESCRIBED IN 2.c ABOVE.

3. CHP WATER TEMPERATURE CONTROL

- a. CHP RETURN WATER TEMPERATURE (T-1) TO JACKET WATER HEAT EXCHANGER SHALL BE CONTROLLED TO SET POINT OF 165°F AND IS NOT ADJUSTABLE.
- b. WHEN GEN-SET STARTS, THE EXHAUST GAS BYPASS TEE SHALL OPEN TO THE EXHAUST HEAT RECOVERY UIT AND THE LOAD BYPASS VALVE (V-2) SHALL FULLY CLOSE OUTLET TO LOAD HEAT EXCHANGERS AND OPEN TO CHP WATER RETURN.
- c. ONCE JACKET WATER TO ENGINE TEMPERATURE (T-2) SET POINT IS ACHIEVED THE BYPASS VALVE (V-2) SHALL FULLY OPEN TO THE LOAD HEAT EXCHANGERS AND CLOSE TO THE CHP WATER RETURN.
- d. UPON SENSING CHP RETURN WATER TEMPERATURE (T-1) TO JACKET WATER HEAT EXCHANGER ABOVE SET POINT, EXCESS HEAT WATER PUMP AND EXCESS HEAT RADIATOR SHALL START AND VALVE (V-3) SHALL MODULATE TO MAINTAIN SET POINT.
- e. IF THE CHP RETURN WATER TEMPERATURE TO JACKET WATER HEAT EXCHANGER IS ABOVE SET POINT AND THE EXCESS HEAT VALVE V-3 IS FULLY OPEN TO THE EXCESS HEAT RADIATOR THE EXHAUST GAS BYPASS VALVE SHALL FULLY OPEN TO BYPASS THE EXHAUST HEAT RECOVERY UNIT. ONCE THE CHP RETURN WATER TEMPERATURE TO JACKET WATER HEAT EXCHANGER IS BELOW SET POINT AND V-3 IS BYPASSING A MIN. OF 25% OF THE FLOW THRU THE EXCESS HEAT RADIATOR FOR 60 MIN. (ADJ.) THE EXHAUST GAS BYPASS VALVE SHALL FULLY OPEN TO THE EXHAUST HEAT RECOVERY UNIT.
- f. IF CHP RETURN WATER TEMPERATURE TO JACKET WATER HEAT EXCHANGER IS BELOW SET POINT THE REVERSE SHALL OCCUR.
- g. IF EXCESS HEAT RADIATOR IS OFF, EXHAUST GAS BYPASS VALVE (V-1) IS FULLY OPEN TO EXHAUST GAS HEAT RECOVERY UNIT, AND CHP RETURN WATER TEMPERATURE (T-1) TO JACKET WATER HEAT EXCHANGER FALLS BELOW SET POINT, LOAD BYPASS VALVE (V-2) SHALL MODULATE OUTLET TO LOAD HEAT EXCHANGERS CLOSED TO MAINTAIN CHP RETURN WATER TEMPERATURE (T-1) SET POINT.

4. ALARMS AND SAFETIES

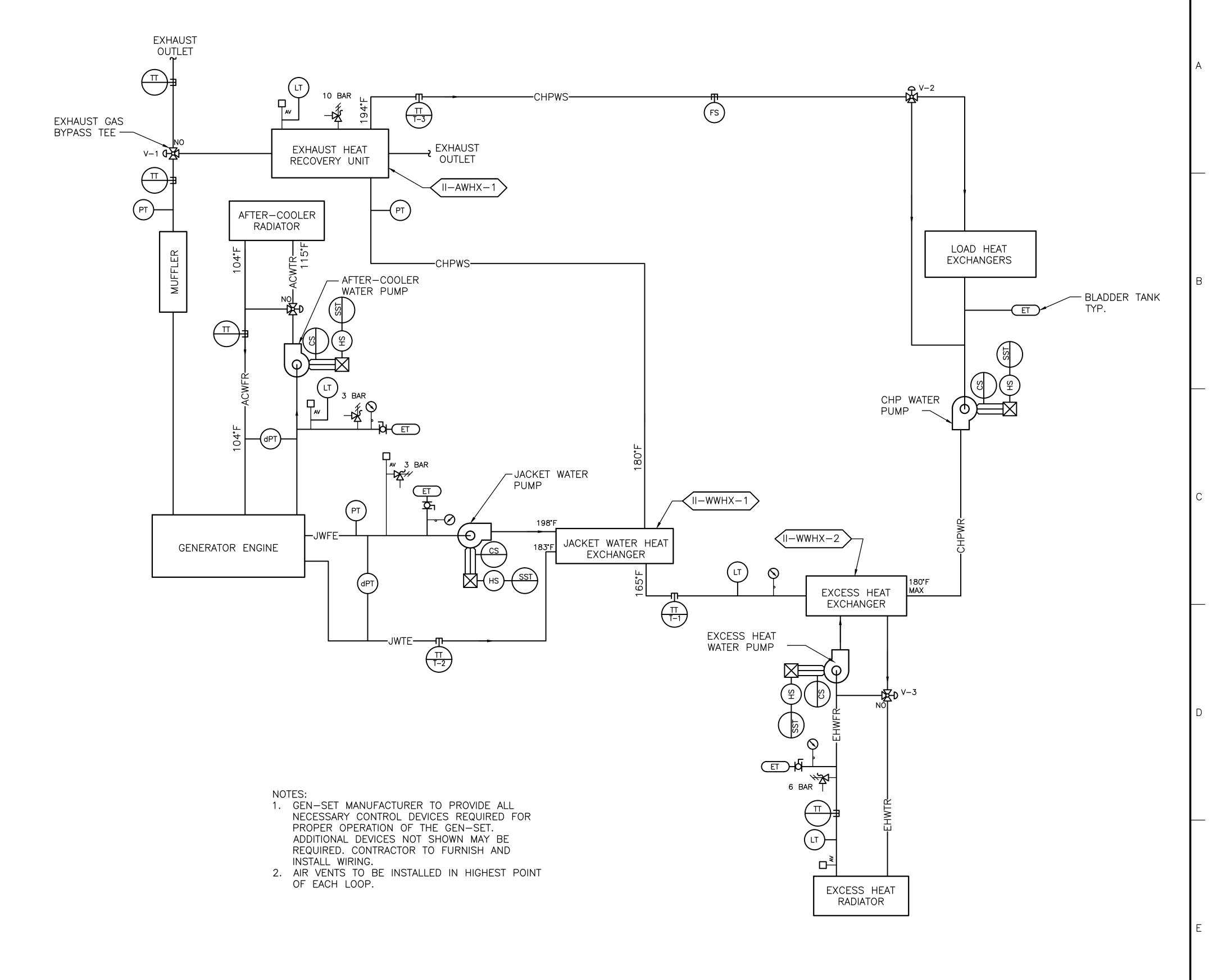
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- a. IF AFTER—COOLER WATER, JACKET WATER, CHP WATER, OR EXCESS HEAT WATER PUMP STATUS DOES NOT MATCH COMMAND, ALARM SHALL BE GENERATED.
- b. IF AFTER—COOLER WATER, JACKET WATER, CHP WATER, OR EXCESS HEAT WATER FLOW SWITCH AND PUMP STATUS DOES NOT MATCH COMMAND, ALARM SHALL BE GENERATED.
- c. IF CHP RETURN WATER TEMPERATURE (T-1) TO ENGINE JACKET HEAT EXCHANGER IS MORE THAN 5°F ABOVE SET POINT; ALARM SHALL BE GENERATED.
- d. IF JACKET WATER TO ENGINE TEMPERATURE (T-2) IS ABOVE SET POINT PLUS 5°F, ALARM SHALL BE GENERATED.
- e. EMERGENCY SHUTDOWN SHALL BE PROVIDED AT GENERATOR CONTROL PANEL AND OPERATING COMPUTER.

 EMERGENCY SHUTDOWN SEQUENCE SHALL SHUT DOWN ALL EQUIPMENT IN THE CHP PLANT WITH THE PUMP
 TIME DELAY DESCRIBED IN SECTION 2 ABOVE.
- e. GENERATOR CONTROL PANEL SHALL RECEIVE ALARM SIGNAL FOR CARBON MONOXIDE & NATURAL GAS SENSORS. ALARM SHALL BE DUPLICATED IN GENERATOR CONTROL PANEL AND OPERATING COMPUTER. EMERGENCY SHUTDOWN SEQUENCE SHALL SHUT DOWN ALL EQUIPMENT IN THE CHP PLANT WITH THE PUMP TIME DELAY DESCRIBED IN SECTION 2 ABOVE.
- f. ALL OTHER ALARMS AND SAFETIES TO ENSURE PROPER OPERATION OF THE GEN-SET.

COMBINED HEAT AND POWER PLANT MECHANICAL SEQUENCE OF OPERATIONS

NTS



2 COMBINED HEAT AND POWER PLANT HEAT RECOVERY PIPING AND CONTROL DIAGRAM

CONSULTANTS:

3

ARCHITECT/ENGINEERS:

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Celebrating 100 Years

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901 820 0820 fax 901 683 1001

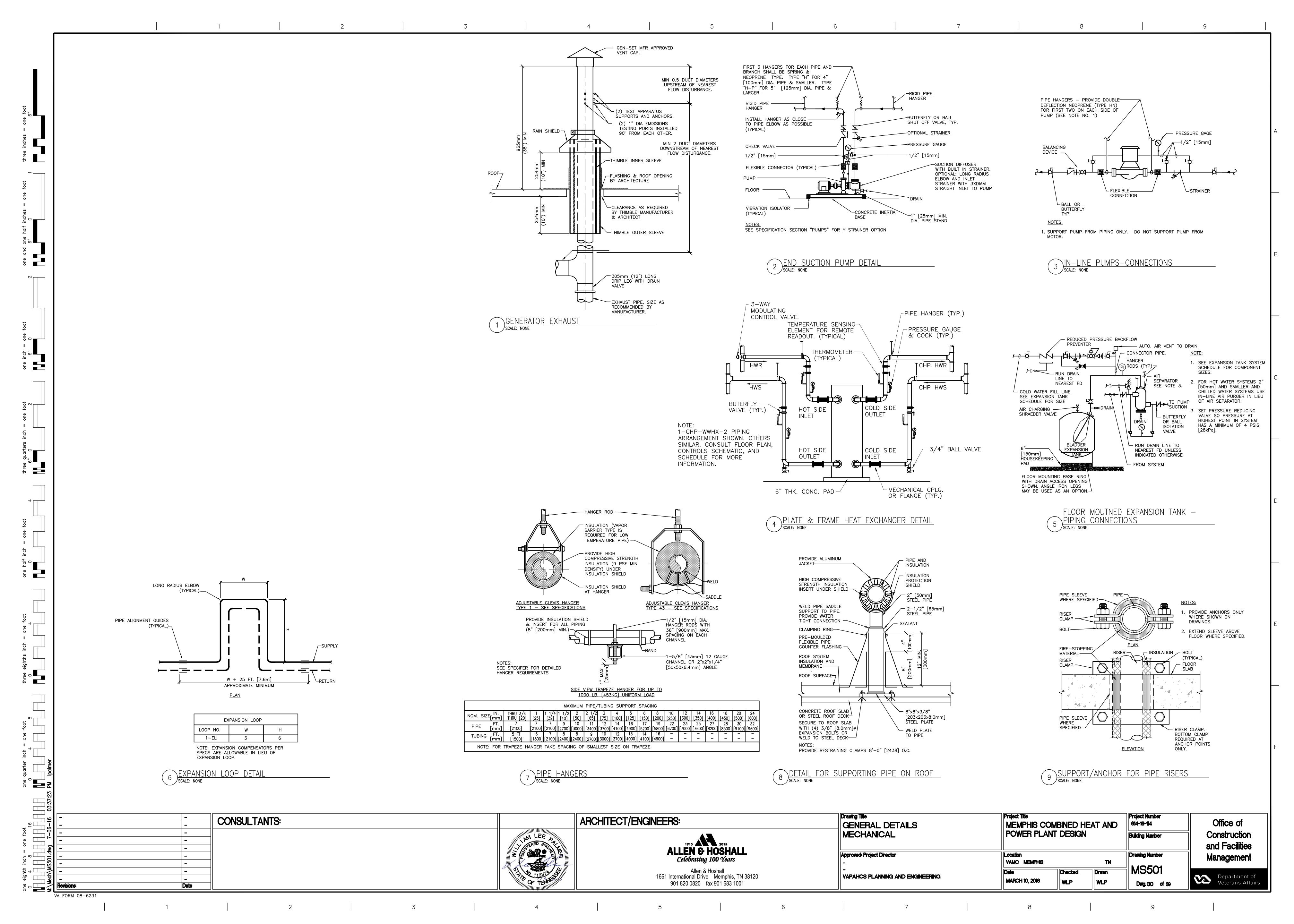
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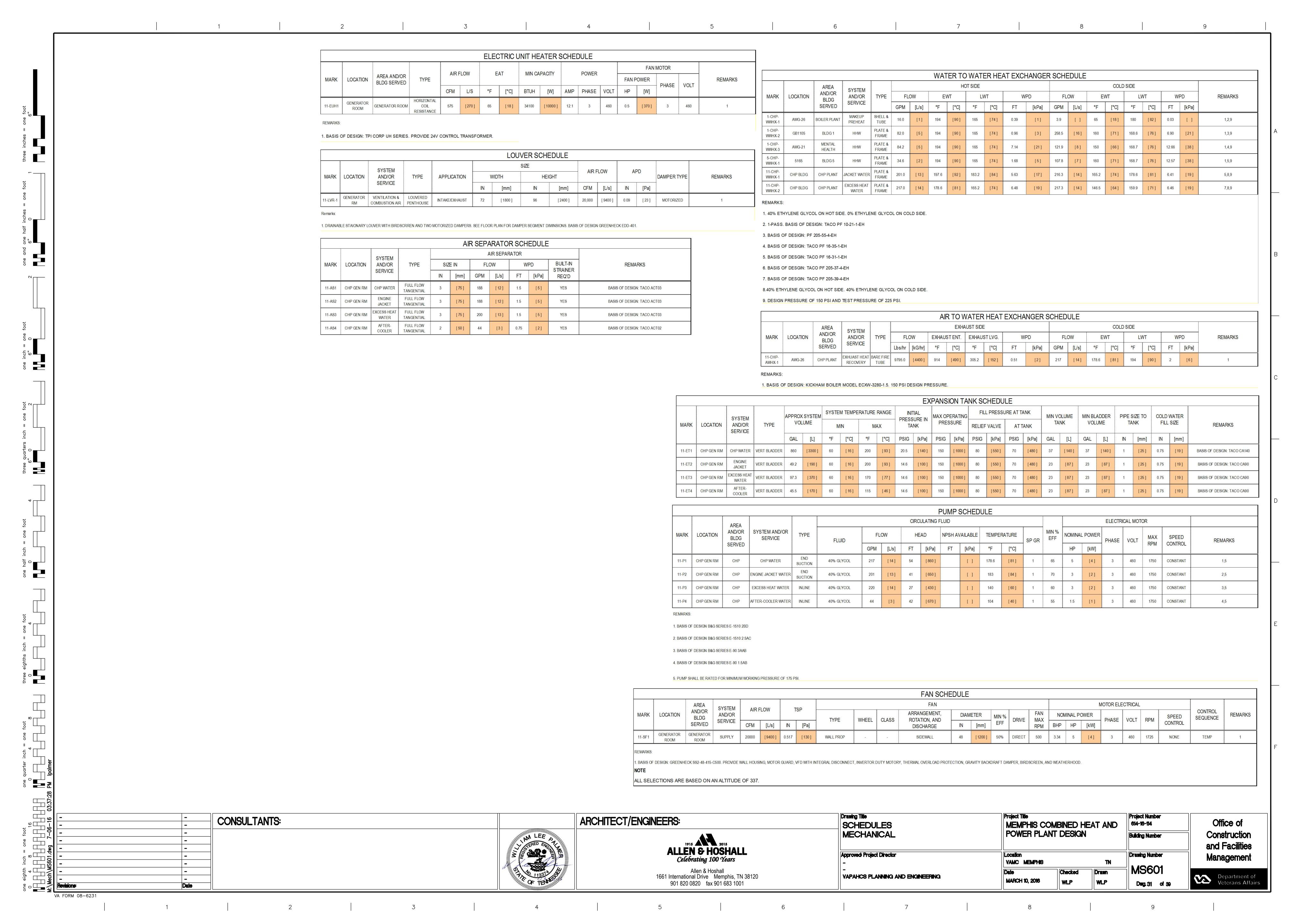
Project Title Drawing Title Project Number MEMPHIS COMBINED HEAT AND CHP PLANT CONTROLS 614-16-114 POWER PLANT DESIGN MECHANICAL **Building Number Approved: Project Director** Location **Drawing Number** VAMC MEMPHIS Drawn **VAPAHCS PLANNING AND ENGINEERING** MARCH 10, 2016 Dwg. 28 of 39

Office of
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and Facilities
Management

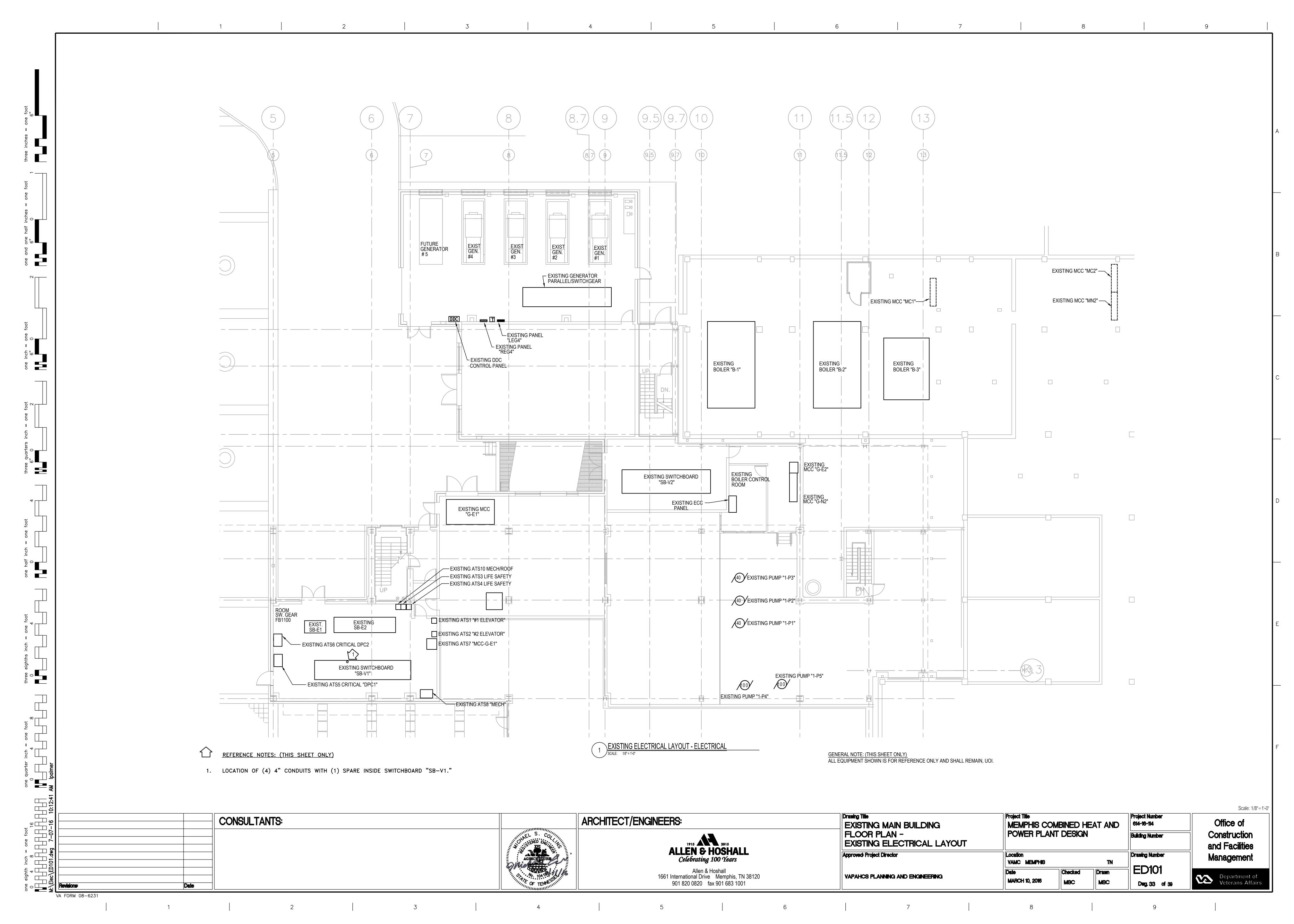
Department of
Veterans Affairs

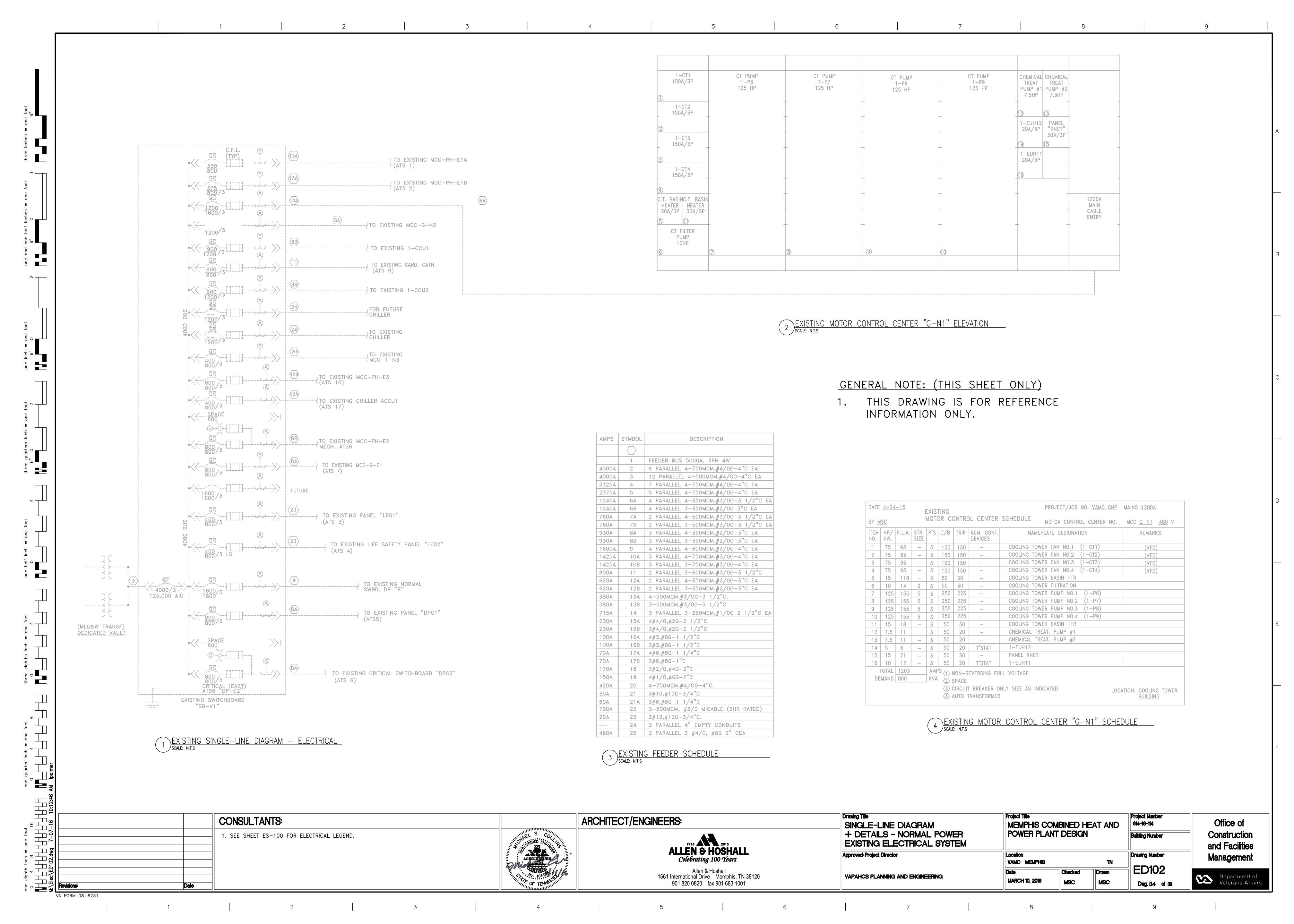
SEQUENCE OF OPERATIONS 1. CHP LOAD HEAT EXCHANGER ENABLE. a.WHEN CHP WATER PUMP IS OFF, THE HWR CONTROL VALVE (V-1) SHALL OPEN TO BYPASS FLOW AROUND THE CHP LOAD HEAT EXCHANGER. b. WHEN THE CHP WATER PUMP IS ON, MODULATION OF THE HWR CONTROL VALVE (V-1) SHALL BE ENABLED. c.EACH HEATING HOT WATER HEAT EXCHANGER EXISTING CONTROL SEQUENCE SHALL BE UPDATED TO ADD CONTROL OF CHP HEAT EXCHANGER. d.ALL EXISTING HEATING HOT WATER HEAT EXCHANGER CONTROLS TO REMAIN (I.E. PUMP CONTROL, SUPPLY TEMPERATURE RESET, ALARMS, ETC.) 2. HEATING WATER TEMPERATURE CONTROL a.HWR 3-WAY CONTROL VALVE (V-1) SHALL FIRST BE MODULATED OPEN FOR FLOW THROUGH CHP LOAD HEAT EXCHANGER TO MAINTAIN HEATING HOT WATER SUPPLY SET POINT (T-1). b.ONCE HWR CONTROL VALVE (V-1) IS FULLY OPEN FOR FLOW THROUGH CHP LOAD HEAT EXCHANGER EXISTING CONTROL SEQUENCE TO MAINTAIN HEATING HOT WATER SUPPLY SET POINT VIA EXISTING STEAM TO WATER HEAT EXCHANGERS SHALL COMMENCE. c.UPON A RISE IN HEATING HOT WATER ABOVE SET POINT, THE REVERSE SHALL OCCUR TO MAXIMIZE HEAT RECLAIMED FROM CHP PLANT. EXISTING STEAM TO WATER HEAT EXCHANGERS SHALL ONLY UTILIZE STEAM WHEN HWR CONTROL VALVE V-1 IS FULLY OPEN TO FLOW THROUGH SEQUENCE OF OPERATIONS THE CHP HEAT EXCHANGER OR WHEN THE CHP WATER PUMP IS OFF ... 1.CHP HEAT EXCHANGER ENABLE. a.WHEN CHP WATER PUMP IS OFF, THE MAKEUP WATER CONTROL VALVE (V-1) SHALL BE OPEN TO BYPASS FLOW AROUND THE CHP LOAD WATER HEAT EXCHANGER. b. WHEN THE CHP WATER PUMP IS ON, MODULATION OF THE MAKEUP WATER CONTROL VALVE (V-1) SHALL BE ENABLED. 2.MAKEUP WATER TEMPERATURE CONTROL -EXISTING TEMPERATURE a.MAKEUP WATER 3-WAY CONTROL VALVE (V-1) SHALL BE MODULATED OPEN FOR FLOW THROUGH CHP HEAT EXCHANGER TO MAINTAIN MAKEUP WATER SUPPLY SET POINT EXISTING STEAM TO (T-1) OF 180°F. WATER HEAT b.UPON A RISE IN MAKEUP WATER ABOVE SET POINT, THE MAKEUP WATER CONTROL EXCHANGERS —— VALVE (V-1) SHALL MODULATE CLOSED FOR FLOW THROUGH THE CHP HEAT - NEW HWR 3-WAY CONTROL EXCHANGER. VALVE. — EXISTING CW/SW TO DEAERATING FEEDWATER HEATER CHP LOAD HEAT EXCHANGER (WATER TO WATER) CHPWR CHPWS CHPWR — EXISTING CW/SW FROM BACKFLOW PREVENTER AND WATER SOFTNER. 1. THESE CONTROL DEVICES, POINTS, AND SEQUENCES TO BE ADDED TO, INTEGRATED, AND CONTROLLED BY THE EXISTING EMS. INTERFACE WITH GEN-SET MANUFACTURER CONTROLS AS REQUIRED. 2. STEAM TO WATER HEAT EXCHANGERS AND PUMPS ARE EXISTING. 1. THESE CONTROL DEVICES, POINTS, AND SEQUENCES TO BE ADDED 3. ALL EXISTING CONTROL SHALL REMAIN. ONLY THOSE EXISTING TO, INTEGRATED, AND CONTROLLED BY THE EXISTING EMS. INTERFACE CONTROL ITEMS REQUIRED FOR CONTROL OF CHP HEAT EXCHANGER WITH GEN-SET MANUFACTURER CONTROLS AS REQUIRED. CHP LOAD HEAT EXCHANGER CONTROLS CHP LOAD HEAT EXCHANGER CONTROLS (HEATING SYSTEM) (BOILER MAKEUP SYSTEM) UNIT HEATER DAMPER FOR COMBUSTION AIR PORTION OF INTAKE LOUVER. DAMPER FOR GEN-SET VENTILATION PORTION OF INTAKE LOUVER. 1. THESE CONTROL DEVICES, POINTS, AND SEQUENCES TO BE INTEGRATED AND CONTROLLED BY THE EXISTING EMS. INTERFACE WITH GEN-SET MANUFACTURER CONTROLS AS REQUIRED. 2. GENERATOR SHALL BE INTERLOCKED WITH D2. WHEN GENERATOR IS ENERGIZED D2 SHALL OPEN. WHEN GEN-SET IS DE-ENERGIZED D2 SHALL CLOSE, 3. ROOM SUPPLY FAN SHALL BE INTERLOCKED WITH D1 & ROOM THERMOSTAT T1. WHEN ROOM THERMOSTAT RISES ABOVE 85°F [29°C] ROOM SUPPLY FAN SHALL RUN & D1 SHALL OPEN. WHEN ROOM THERMOSTAT DROPS BELOW 80°F [27 C] ROOM SUPPLY FAN VFD SHALL SLOW FAN TO MAINTAIN SPACE TEMP ABOVE 72°F. UPON A FURTHER DROP IN TEMPERATURE WITH FAN AT 20% MIN. SPEED SUPPLY FAN SHALL STOP & D1 SHALL CLOSE. 4. IF 11-SF-1 STATUS DOES NOT MATCH THE COMMAND AN ALARM SHALL BE GENERATED. 5. ELECTRIC UNIT HEATER SHALL BE INTERLOCKED WITH ROOM THERMOSTAT T2 SET AT 70°F [21°C]. ON A DROP IN ROOM TEMPERATURE BELOW 68°F [20°C] ELECTRIC UNIT HEATER SHALL BE ENERGIZED & ON A RISE IN ROOM TEMPERATURE ABOVE 72°F [22°C] ELECTRIC UNIT HEATER SHALL BE DE-ENERGIZED. IF THE ELECTRIC UNIT HEATER COMMAND DOES NOT MATCH STATUS OR THE SPACE TEMPERATURE DROPS BELOW 60°F AN ALARM SHALL BE GENERATED. 6. CARBON MONOXIDE (50 PPM ADJ) & NATURAL GAS (10,000 PPM ADJ) DETECTOR SHALL INITIATE ALARM IN DDC CONTROL SYSTEM AND INTERLOCK WITH GENERATOR CONTROLS WHEN CONCENTRATIONS ARE ABOVE THRESHOLD, UPON ALARM, GENERATOR SHALL INITIATE SHUTDOWN SEQUENCE, D1 & D2 SHALL OPEN AND SF-1 SHALL ENERGIZE. GENERATOR ROOM CONTROLS **Project Title Project Number** Drawing Title CONSULTANTS: ARCHITECT/ENGINEERS: Office of MEMPHIS COMBINED HEAT AND HVAC ENERGY MANAGEMENT SYSTEM 614-16-114 POWER PLANT DESIGN CONTROLS - MECHANICAL Construction **Building Number** 1915 2015 and Facilities ALLEN & HOSHALL
Celebrating 100 Years Approved Project Director **Drawing Number** Location Management VAMC MEMPHIS Allen & Hoshall 1661 International Drive Memphis, TN 38120 Drawn Checked Department of Veterans Affairs VAPAHCS PLANNING AND ENGINEERING MARCH 10, 2016 901 820 0820 fax 901 683 1001 Dwg. 29 of 39 VA FORM 08-6231 5 2 6 9

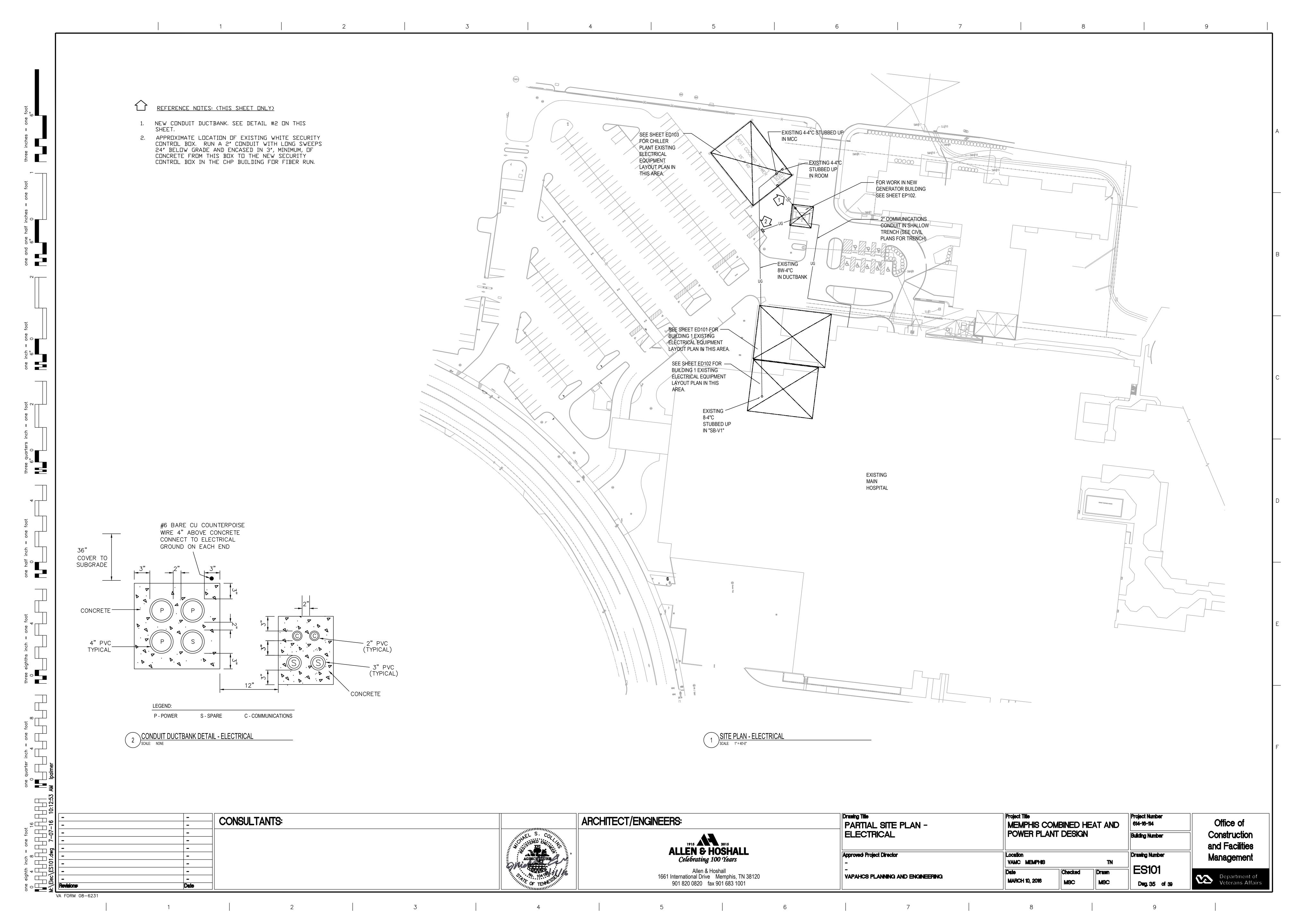


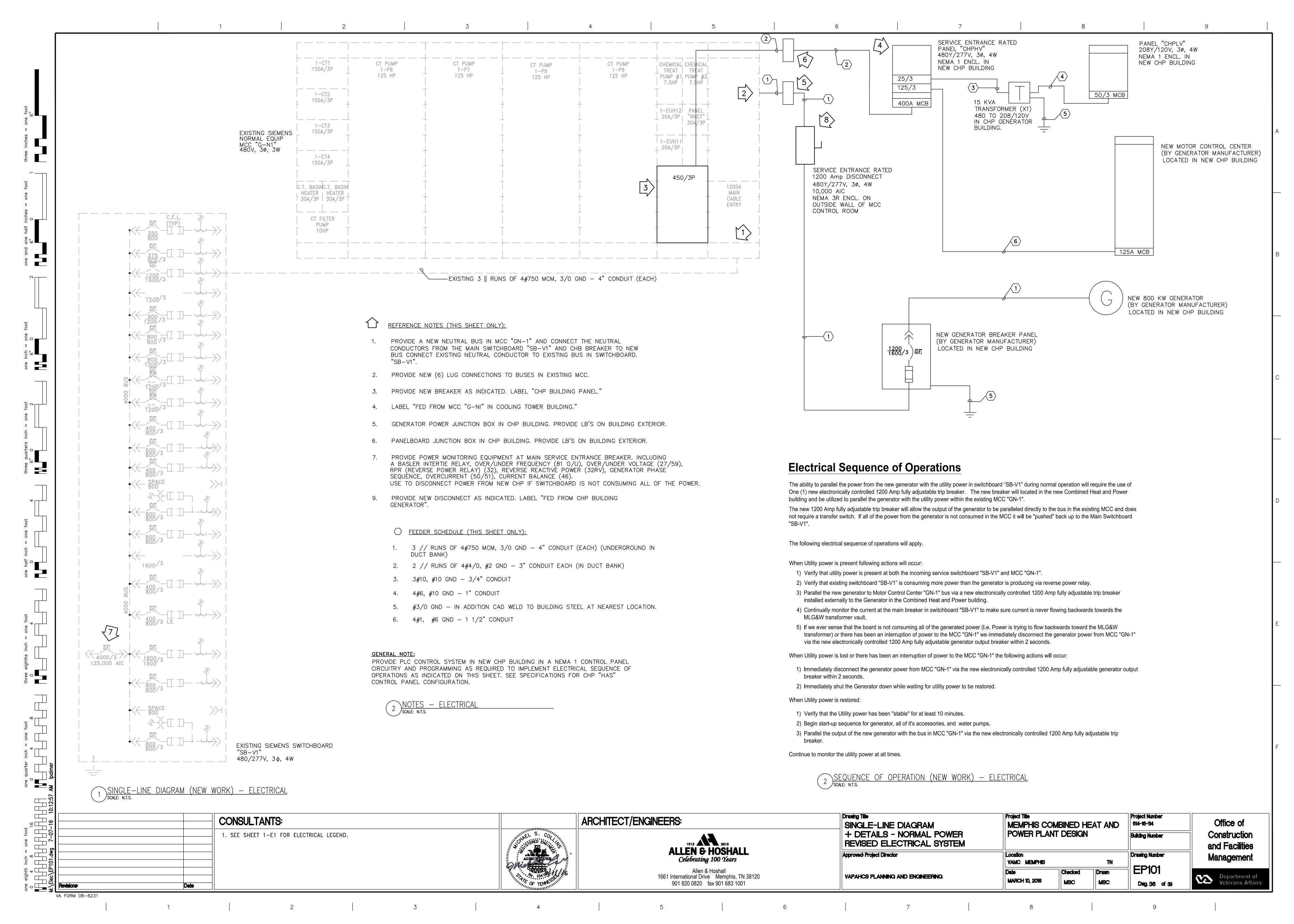


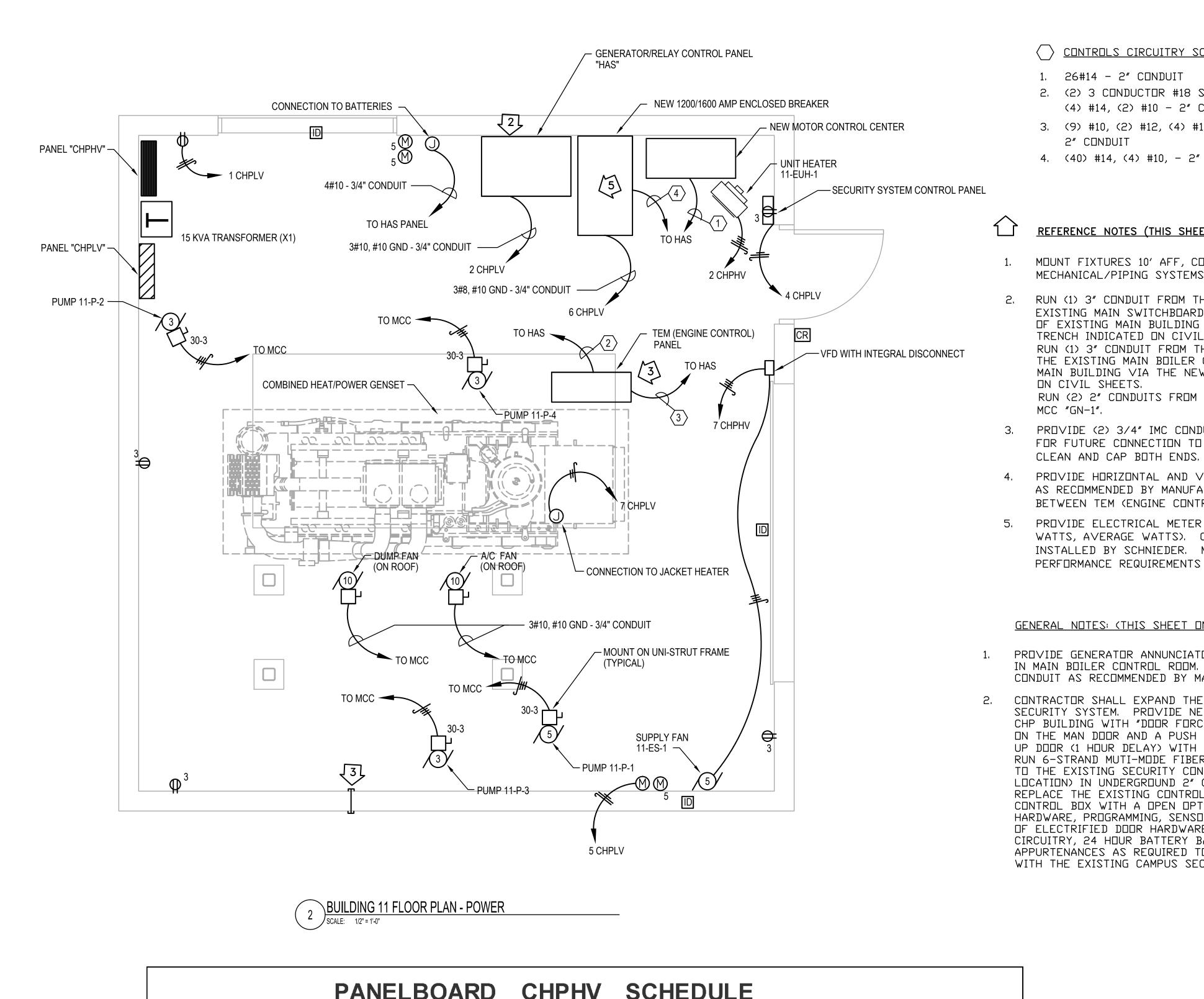
LEGEND FIXTURE MOUNTING FIXTURE TYPE LENS PENDANT MTD. FLUORESCENT LIGHTING FIXTURE F-FLUORESCENT SS-SUSPENDED S-SURFACE A-ACRYLIC SURFACE MTD. LED WALL PACK LED-LIGHT EMITTING DIODE FIX. FIX. LENS FIN. LAMP VOLTS COMMENTS NO. WATTS TYPE MANUF'R CATALOG NO. DENOTES FIXTURE TYPE A - SEE FIXTURE SCHEDULE NO. SPST SWITCH - MTD. 48" AFF, UOI WH | 2 | 32 | UNV | FLUORESCENT INDUSTRIAL FIXTURE DCIM-232-PAF A METALUX B MCGRAW-EDISON ISC-E01-LED-E1-BL2-BZ S | LED | A | B | - | 25 | UNV | EXTERIOR LED WALL PACK - MTD. 13' AFG TO BOTTOM OF FIXTURE DUPLEX RECEPTACLE, MTD. 18" AFF, UOI CONDUIT STUB UP FIXTURE SCHEDULE NOTE: ABOVE FINISHED FLOOR LIGHT FIXTURES SHALL BE AS SPECIFIED OR A SUBMITTED ACCEPTACLE AND APPROVED ALTERNATE ABOVE FINISHED GRADE LIGHT FIXTURE SCHEDULE - ELECTRICAL SCALE: N.T.S UNLESS OTHERWISE INDICATED 277/480V 3PH, 4W PANELBOARD - SEE SINGLE LINE DIAGRAM 120/208V 3PH, 4W PANELBOARD - SEE SINGLE LINE DIAGRAM WIRE IN CONDUIT RUN OVERHEAD - CONCEALED IN OR ABOVE CEILING IN WALL OR EXPOSED ON STRUCTURE LOAD CALCULATIONS ─ WIRE IN CONDUIT RUN CONCEALED BELOW FLOOR, IN WALL OR BELOW GRADE SEE PANEL BOARD SCHEDULES ON SHEET EP102 NOTE INDICATION FAULT CIRCUIT CALCULATIONS DRIVEN GROUND ROD JUNCTION BOX Available Fault Current Calculation TRANSFORMER by:John Sokolik Ver. 7.2 1,200 amperes kVA = jmp1jds@comcast.net Utility Fault Current CONNECTION TO MOTORIZED DAMPER I = <u>kVA x 1000</u> = trans. FLA trans. FLA = E x 1.732 MOTOR CONNECTION - NO. INDICATES HORSEPOWER $I_{sca} = \underline{trans. FLA \times 100 \times PF}$ $Z = \frac{3.00\%}{}$ NON FUSE HEAVY DUTY DISCONNECT SWITCH - SIZE AS INDICATED transformer Z $I_{sca} = 33,764$ amperes Isca = ampere short-circuit current RMS symmetrical. SECURITY SYSTEM - CARD ACCESS READER - MOUNT 48" AFF. Three Phase 480/277 Point to Point Method SECURITY SYSTEM - INTRUSION DETECTION DEVICE MOUNTED 90" AFF. Length (distance) FEET ▼ L = 125 Copper in Nonmetallic Raceway ▼ 'f' factor = N x C x E L-N 1.732 x L x I $I_{sca} = 1,200$ # conductors per phase N C = 28,304 Phase Conductor 750 kcmil ▼ Phase conductor constant Volt Line to Line f = 0.006C = 28,304 Neutral Conductor 750 kcmil ▼ Neutral conductor constant EL-N = **277** Volt Multiplier Volt Line to Neutral f = 0.017M = <u>1</u> 1 + f Line to Line M = 0.994M = 0.984Line to Neutral Fault Current at Service Equipment Isca x M = fault current at terminals of main disconnect L- L = 1,192 amperes Isca x M = fault current at terminals of main disconnect L- N = 1,180 amperes CONTRACTOR SHALL PERFORM AN ARC FLASH ANALYSIS IN ACCORDANCE VOLTAGE DROP CALCULATIONS WITH IEEE STANDARD 1584A. FOR EACH BUS ANALYZED (ALL NEW ELECTRICAL EQUIPMENT, ALONG WITH MCC "GN-1" AND SWITCHBOARD 3-PHASE VOLTAGE DROP WHERE: L = LENGTH R = THE RESISTANCE OF THE CONDUCTOR "SB-1" AS INDICATED IN THE SPECIFICATIONS. COORDINATE WITH Vdrop = SQRT(3) * I * R * L I = AMPS EXISTING CAMPUS STUDY IF AVAILABLE. CM = CIRCULAR MILLS OR WIRE GUAGE GENERAL NOTES - ELECTRICAL 3-PHASE VOLTAGE DROP WHERE: L = LENGTH R = THE RESISTANCE OF THE CONDUCTOR Vdrop = 2 * I * R * L CM = CIRCULAR MILLS OR WIRE GUAGE 4 CALCULATIONS - ELECTRICAL
SCALE: N.T.S AM logimer Drawing Title Project Number ARCHITECT/ENGINEERS: CONSULTANTS: Office of MEMPHIS COMBINED HEAT AND LEGEND, LIGHTING FIXTURE 614-16-114 SCHEDULE AND CALCULATIONS -POWER PLANT DESIGN Construction Building Number 1915 2015 ELECTRICAL and Facilities ALLEN & HOSHALL Approved: Project Director Location Drawing Number Management Celebrating 100 Years VAMC MEMPHIS EH101 Allen & Hoshall 1661 International Drive Memphis, TN 38120 Checked Department of Veterans Affairs VAPAHCS PLANNING AND ENGINEERING MARCH 10, 2016 MSC 901 820 0820 fax 901 683 1001 Dwg. **32** of 39 VA FORM 08-6231 2 3 4 5 7











CONTROLS CIRCUITRY SCHEDULE

- 1. 26#14 2" C□NDUIT
- 2. (2) 3 CONDUCTOR #18 SHIELDED, (4) #14, (2) #10 − 2" C□NDUIT
- 3. (9) #10, (2) #12, (4) #14 -2" CONDUIT
- 4. (40) #14, (4) #10, − 2" C□NDUIT

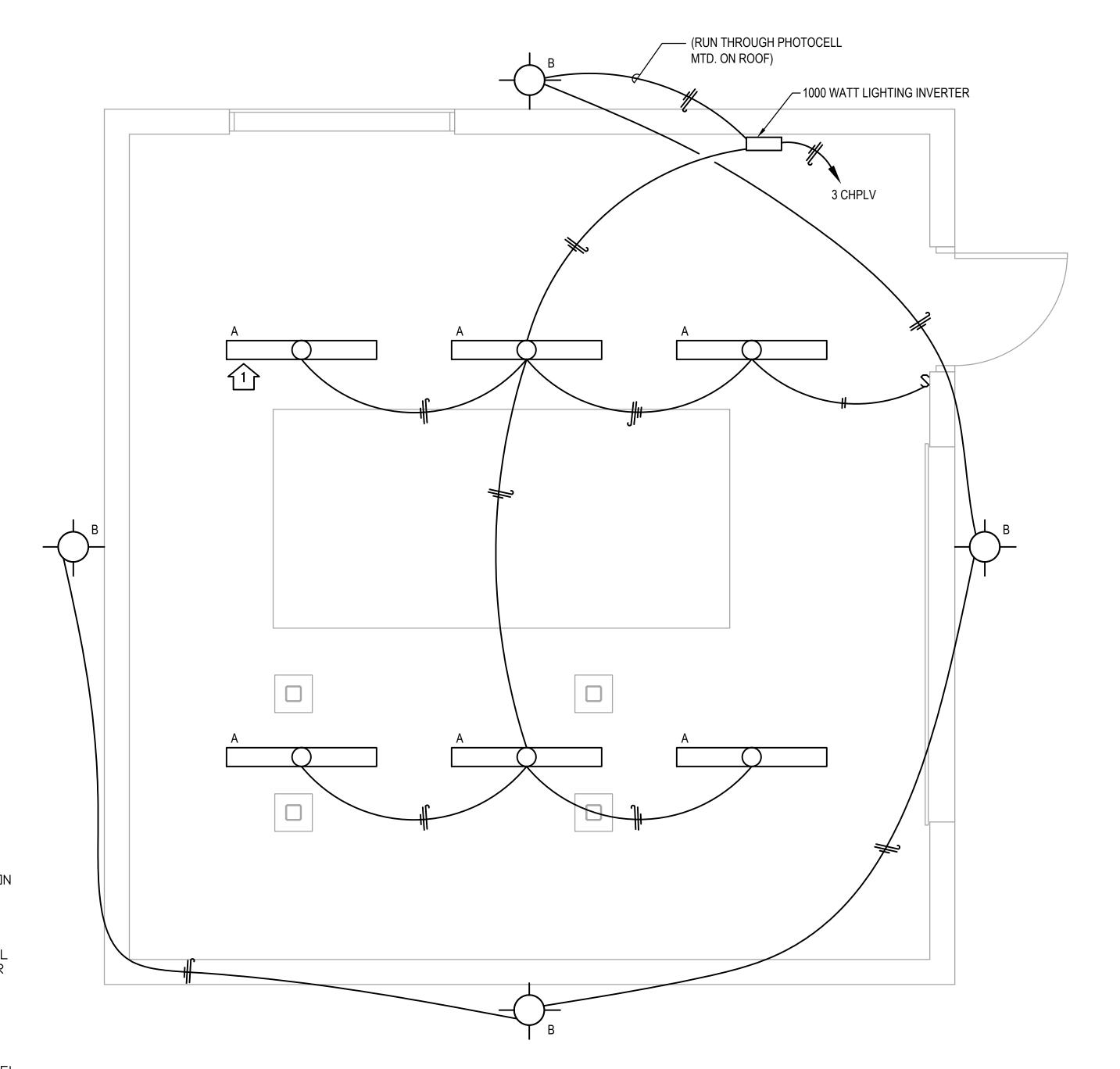
REFERENCE NOTES (THIS SHEET ONLY):

- MOUNT FIXTURES 10' AFF, COORDINATE LOCATIONS WITH MECHANICAL/PIPING SYSTEMS. (TYP)
- 2. RUN (1) 3" CONDUIT FROM THIS CONTROL PANEL TO EXISTING MAIN SWITCHBOARD "SB-V1" IN ROOM FB1100 OF EXISTING MAIN BUILDING VIA THE NEW UTILITY TRENCH INDICATED ON CIVIL SHEETS. RUN (1) 3" CONDUIT FROM THIS CONTROL PANEL TO THE EXISTING MAIN BOILER CONTROL ROOM IN EXISTING MAIN BUILDING VIA THE NEW UTILITY TRENCH INDICATED ON CIVIL SHEETS. RUN (2) 2" CONDUITS FROM THIS CONTROL PANEL TO
- MCC "GN-1". 3. PROVIDE (2) 3/4" IMC CONDUITS AT 18" AFF THROUGH WALL FOR FUTURE CONNECTION TO INTELLIGENT METER.
- 4. PROVIDE HORIZONTAL AND VERTICAL CABLE-TRAY AS RECOMMENDED BY MANUFACTURER FOR CABELING BETWEEN TEM (ENGINE CONTROL) PANEL AND GENSET.
- 5. PROVIDE ELECTRICAL METER (VOLTS, AMPS, WATTS, PEAK WATTS, AVERAGE WATTS). CONNECT TO EXISTING AUMS INSTALLED BY SCHNIEDER, METER TO MEET THE TYPE AND PERFORMANCE REQUIREMENTS OF THE EXISTING AUMS.

GENERAL NOTES: (THIS SHEET ONLY):

PROVIDE GENERATOR ANNUNCIATOR PANEL AS SPECIFIED IN MAIN BOILER CONTROL ROOM. PROVIDE CABLING IN CONDUIT AS RECOMMENDED BY MANUFACTURER.

CONTRACTOR SHALL EXPAND THE EXISTING HOSPITAL OPEN OPTION SECURITY SYSTEM. PROVIDE NEW PANEL AND CONTROLS IN THE CHP BUILDING WITH "DOOR FORCE"AND "DOOR HOLD" CONTROLS ON THE MAN DOOR AND A PUSH BUTTON "BYPASS" FOR THE ROLL UP DOOR (1 HOUR DELAY) WITH REPORT TO SECURITY. RUN 6-STRAND MUTI-MODE FIBER FROM THE NEW SECURITY PANEL TO THE EXISTING SECURITY CONTROL BOX (SEE SHEET ES101 FOR LOCATION) IN UNDERGROUND 2" COMMUNICATIONS CONDUIT. REPLACE THE EXISTING CONTROLLER IN THE EXISTING SECURITY CONTROL BOX WITH A OPEN OPTIONS "SSP-D2". PROVIDE ALL HARDWARE, PROGRAMMING, SENSORS, ENCLOSURES, OPERATION OF ELECTRIFIED DOOR HARDWARE, CARD READER AND CIRCUITRY CIRCUITRY, 24 HOUR BATTERY BACK-UP, AND ALL NECESSARY APPURTENANCES AS REQUIRED TO INTERFACE NEW SECURITY PANEL WITH THE EXISTING CAMPUS SECURITY SYSTEM.



BUILDING 11 FLOOR PLAN - LIGHTING

PANELBOARD CHPHV SCHEDULE														
200 AMP MAIN CIRCUIT BREAKER 277 /480 VOLTS 3 PHASE, 4WRE, 14,000 K.A.I.C. MIN., SURFACE MTD. 60HZ.														
LOAD SERVED	L	OAD (VA)	BKR.	CKT.	F	PHA:	SE	CKT.	BKR.	L	OAD (VA	LOAD SERVED	
	А	В	С	SIZE	NO.	/	4 B	С	NO.	SIZE	Α	В	С	
PANEL "CHLPV"	6540			25/3	1	7		+~	2	20/3	3351			11-EUH-1
-		3100		1	_	7	•	_	-	-		3351		-
-			3200	1	_	7		~	-	_			3351	-
FAN 11-SF-1	2105			20/3	7	7		_	8	20/3				SPARE
-		2105		1	-	7	8	_	1	-				_
-			2105	1	-	አ		- ∼	-	-				-
MCC CHP	19878			125/3	13	7		_	14	20				SPARE
-		19878		ı	-	7	-	_	16	20				SPARE
-			19878	-	-	አ		~	18	20				SPARE
SPARE				20/3	19	7		}	20	100/3	0			TVSS
-				ı	-		•	_	-	_		0		_
-				-	_	7		~	-	-			0	-
SUBTOTAL	28523	25083	25183								3351	3351	3351	
TOTALS			PHASEA			Р	HAS	EΒ		PHASE		TOTAL		TOTAL AMPS:
			31874				2843	34		28534		88842	VA	185.39

2 3 4 5

50 AMP MAIN CIRCUIT BREAKER 208 /120 VOLT 3 PHASE, 4WIRE, 10 K.A.I.C. MIN., SURFACE MTD. 60HZ.														
LOAD SERVED	Carrier of Carrier and	OAD (V		BKR. CKT. PHAS					T. BKR. LOAD (VA)			LOAD SERVED		
	Α	В	С	SIZE	NO.	A E	3 (NO.	SIZE	Α	В	С	
RECEPTACLES	540			20	1	-^+	+	\vdash	2	40	4000			GEN AUX (HAS) PANEL
LIGHTING INVERTER		1000		20	3	$\overline{}$	+	\vdash	4	20		100		SECURITY PANEL
DAMPERS			200	20	5	-	+	~	6	30			3000	GEN BREAKER PANEL
JACKET WTR HTR	2000			20/2	7	-	\blacksquare	Γ	8	20				SPARE
-		2000		-	-	$\overline{}$	+	7	10	20				SPARE
SPARE				20	11	$\overline{}$		-	12	20				SPARE
SPARE				20	13			~	14	20				SPARE
SPARE				20	15	$\overline{}$	+	Γ	16	20				SPARE
SPARE				20	17	$\overline{}$	-	-^	18	20				SPARE
SPARE				20	19	-^-	\blacksquare	7	20	40/3	0			TVSS
SPARE				20	21		•	7	-	ī		0		-
SPARE				20	23	$\overline{}$		~	-	-			0	-
SUBTOTAL	2540	3000	200								4000	100	3000	
TOTALS		F	PHASE	A	Р	HAS	ΕE	3	Р	HASE	С	TOTAL		TOTAL AMPS:
			6540			310	0			3200		12840	VA	44.6

PANEL BOARD SCHEDULES - POWER

SCALE: 1/2" = 1'-0"

CONSULTANTS:

VA FORM 08-6231

ARCHITECT/ENGINEERS:

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Allen & Hoshall 1661 International Drive Memphis, TN 38120 901 820 0820 fax 901 683 1001

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rawing Title FLOOR PLAN COMBINED HEAT AND POWER GENERATOR ROOM – ELECTRICAL	Project Title MEMPHIS COMI POWER PLANT	Project Number 614-16-114 Building Number -		
pproved Project Director VAPAHCS PLANNING AND ENGINEERING	Location VAMC MEMPHIS Date MARCH 10, 2016	Checked MSC	TN Drawn MSC	Drawing Number EP102 Dwg. 37 of 39

Office of Construction and Facilities Management Department of Veterans Affairs

